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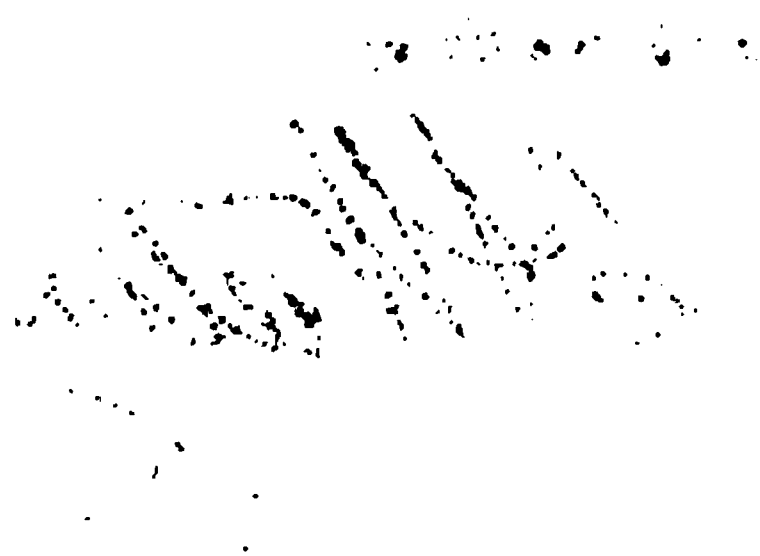
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New York State Dairy Commission

NINTH ANNUAL REPORT

OF THE

6658

NEW YORK

STATE DAIRY COMMISSIONER,

FOR THE YEAR 1892.

TRANSMITTED TO THE LEGISLATURE FEBRUARY 7, 1893.

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JAMES B. LYON, STATE PRINTER.

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STATE OF NEW YORK.

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IN ASSEMBLY,

FEBRUARY 7, 1893.

NINTH ANNUAL REPORT

OF THE

NEW YORK STATE DAIRY COMMISSIONER.

To the Honorable the Legislature of the State of New York :

In accordance with the provisions of the statutes, applicable thereto, I hereby submit the report of the work performed by the New York State Dairy Commission for the year ended September 30, 1892.

JOSIAH K. BROWN,
New York State Dairy Commissioner.

REPORT.

To the Legislature of the State of New York :

In submitting this my ninth annual report permit me to call your attention to the fact that the eighth annual report, which was presented at the proper time, as required by law, was printed by the State printer and nearly ready for binding, when it was destroyed by fire, which occurred on the 12th day of September, 1892, destroying the entire building and contents of the printing-house of James B. Lyon, State printer.

That report we have ready, however, for the printer as soon as he shall be able to print it; had it not been for this delay that report would have been distributed long ere this.

This department is charged with enforcing the laws passed, with reference to adulterated and imitation dairy products, by the Legislature of this State since the year 1883, and designated as chapters 202 of the Laws of 1884, 183 of the Laws of 1885, 193 of the Laws of 1887; 577 of the Laws of 1886, 430 of the Laws of 1887, 298 of the Laws of 1888, 550 of the Laws of 1888, 515 of the Laws of 1889, 140 of 1890.

For the purpose of systematizing the work and putting the employes of this department in touch as near as possible with the people who would be affected by the adulteration of these products, I have divided the State into ten divisions, each of which except the first is under the charge of an assistant commissioner. They are as follows:

First division.—Comprising the following counties: Albany, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie and Washington.

Second division.—Comprising Kings, New York, Queens, Richmond, Suffolk and one-half of Westchester.

Third division.—Comprising Columbia, Delaware, Dutchess, Greene, Orange, Putnam, Rockland, Sullivan, Ulster and one-half of Westchester.

Fourth division.—Comprising Essex, Fulton, Hamilton, Herkimer, Montgomery, Oneida, Oswego, Warren.

Fifth division.—Comprising Clinton, Franklin, Jefferson, Lewis, St. Lawrence.

Sixth division.—Comprising Broome, Chenango, Cortland, Madison, Onondaga, Tioga, Tompkins.

Seventh division.—Comprising Chemung, Genesee, Livingston, Schuyler, Steuben, Wyoming.

Eighth division.—Comprising Cayuga, Monroe, Ontario, Seneca, Wayne, Yates.

Ninth division.—Comprising Erie, Niagara, Orleans.

Tenth division.—Comprising Allegany, Cattaraugus, Chautauqua.

The assistant commissioners in charge of the respective divisions receive instructions from and report directly to this office. Each assistant commissioner has charge of the work in the counties in his division and is held responsible for the same. The men working in such divisions receive instructions from, report to, and are held responsible by, the assistant commissioner for the work which they are instructed to do.

The Legislature of 1884 passed chapter 202 of the Laws of that year, whereby they created the Dairy Commission, and among other provisions of that law, provided against the manufacture, sale, or offering for sale, or selling, certain oleaginous substances, placing the enforcement of the act upon the Dairy Commissioner. The provisions of the law against such manufacture and sale was as follows:

No person shall manufacture out of any oleaginous substance or substances, or any compound of the same, other than that produced from unadulterated milk, or cream from the same, any article designed to take the place of butter or cheese produced from pure, unadulterated milk, or cream of the same, or shall sell, or offer for sale, the same as an article of food. This provision shall not apply to pure skim-milk cheese made from pure

skim-milk. Whoever violates the provisions of this section shall be guilty of a misdemeanor, and be punished by a fine of not less than one hundred nor more than five hundred dollars, or not less than six months or more than one year's imprisonment, or by both such fine and imprisonment for the first offense, and by imprisonment for one year for each subsequent offense.

It will be noticed from reading the section above quoted, that the prohibitions are against any oleaginous substance not made from pure milk, or cream of the same, designed to take the place of, or to be used as, a substitute for butter or cheese, the product of the dairy. Oleomargarine is an oleaginous substance not made from pure milk, or cream of the same, and is designed to take the place of, or to be used as a substitute for, butter, the product of the dairy.

At the time that this law took effect, April 24, 1884, oleomargarine was being sold in the State of New York at the rate of 15,000,000 pounds per year. As it was clearly evident that its manufacture and sale within this State was a violation of the above provision of law, it was also quite evident that so large an industry would not submit to being closed out without first interposing all the objections, legal and technical, within its power.

The first prosecutions were commenced in this State in the fall of 1884, a large number of cases being made by this department. A case was selected by those interested in the defense and was appealed, with the intention of making it a test case in which the constitutionality of the law was to be questioned.

Two such cases particularly were carried to the General Term, namely: The People against McCann, and the People against Marx, the former being decided by the General Term of the first department and the latter by the General Term of the third department; in both these cases the defendants were convicted under the law, and conviction was sustained by both General Terms. It was decided to appeal the case of the People against Marx. It was argued before the Court of Appeals, April 21, 1885. That court decided the case on June sixteenth of that year; it declared the section unconstitutional, on the ground that it prohibited the manufacturing of any oleaginous substance as

an article of food to be used as a substitute for butter or cheese, produced from pure unadulterated milk or cream, without limiting the prohibition to simulated substitutes; it absolutely prohibited the manufacture or sale of any compound designed to be used as a substitute for butter or cheese, however wholesome, valuable and cheap it might be and however plainly and fairly the character of the substitute might be avowed; that it was a violation of that principal in the Constitution that guarantees to every person the right to follow such industrial pursuits not injurious to the community as he may see fit. After the argument of this case in the Court of Appeals it was feared, from the nature of the arguments, as they were made, that the court would hold the law unconstitutional on the grounds above set forth; for that reason friends of the department who were interested in putting a stop to the sale of these goods in the manner in which they had been sold, introduced in the Legislature a bill, which was passed on April 30, 1885, which provided, among other things, against the manufacture and sale of any oleaginous substance in imitation or semblance of butter or cheese, not produced from pure milk or cream of the same. The provisions thus made were embodied in sections 7 and 8 of chapter 183 of the Laws of 1885, as amended by chapter 577 of the Laws of 1886, which read as follows:

§ 7. No person by himself or his agents or servants, shall render or manufacture out of any animal fat or animal or vegetable oils not produced from unadulterated milk or cream from the same, any article in imitation or semblance of natural butter or cheese produced from pure unadulterated milk or cream of the same, nor mix, compound with, or add to milk, cream or butter any acids or other deleterious substance or any animal fats or animal or vegetable oils not produced from milk or cream, so as to produce any article or substance or any human food in imitation or semblance of natural butter or cheese, nor sell, keep for sale, or offer for sale, any article, substance, or compound made, manufactured or produced in violation of the provisions of this section, whether such article, substance or compound shall be made or produced in this State, or elsewhere. This section shall not be so construed as to require evidence of a willful or intentional violation thereof. Whoever violates the provisions of this section shall be guilty of a misdemeanor, and be punished by a fine of not

less than one hundred dollars or more than five hundred dollars or not less than six months or more than one year's imprisonment for the first offense, and by imprisonment for one year for each subsequent offense. Nothing in this section shall impair the provisions of section six of this act.

§ 8. No person shall manufacture, mix or compound with or add to natural milk, cream or butter any animal fats or animal or vegetable oils, nor shall he make or manufacture any oleaginous substance not produced from milk or cream, with intent to sell the same for butter or cheese made from unadulterated milk or cream or have the same in his possession, or offer the same for sale with such intent, nor shall any article or substance or compound so made or produced be sold intentionally or otherwise as and for butter or cheese, the product of the dairy. No person shall coat, powder or color with annatto or any coloring matter whatever, butterine or oleomargarine, or any compounds of the same or any product or manufacture made in whole or in part from animal fats or animal or vegetable oils not produced from unadulterated milk or cream whereby the said product, manufacture or compound shall resemble butter or cheese, the product of the dairy, or shall have the same in his possession, with intent to sell the same, or shall sell or offer the same for sale. No person shall be excused from liability under this section or section seven of this act on account of want of knowledge of the nature or ingredients of the product so in his possession, sold or offered for sale by him. Whoever violates any of the provisions of this section shall be guilty of a misdemeanor and be punished by a fine of not less than one hundred dollars nor more than one thousand dollars. This section shall not be construed to impair or affect the prohibitions of sections six and seven of this act.

The decision in the case of *The People against Marx* necessarily took with it the dismissal of all cases that had been made from the time that that case was appealed until its decision which had been "hung up" as it were in the courts awaiting the decision of that case, so that all the work of the commission up to this point in prosecuting violations of this character came to naught.

Our defeat in the Marx case did not discourage us, although it gave considerable encouragement to the dealers in imitation dairy products. We proceeded immediately to procure samples of the imitation material then being sold upon the market. We made a number of cases against persons handling these goods, the sale of which we believed to be in violation of the law of 1883

as above given. Among these cases was one against one Lipman Arensberg. Mr. Arensberg was indicted by the grand jury and was convicted on February 5, 1886, under the third count of the charges against him which charged defendant with the crime of selling an article in imitation or semblance of natural butter.

Upon the trial it appeared from the evidence that the defendant who was a dealer in that product, selling it under the name of, as and for oleomargarine, and that the compound was so colored as to resemble butter, so that this case was before the courts involving the question of the constitutionality of the provisions of the law prohibiting the manufacture and sale of any oleaginous substance not made from pure milk or cream of the same, so made as to be in imitation or semblance of natural butter, the product of the dairy. The Court of Appeals decided in this case that the law was constitutional; that to warrant a conviction it was not necessary to show that the article sold was calculated to deceive the person who bought it in this instance; it is enough that it was in imitation and semblance of butter and calculated to deceive any one who might buy it. The artificial coloring of oleomargarine for the mere purpose of making it resemble dairy butter is a violation of the statute. These sections as given, now stand as the law in this State with reference to imitation butter and cheese.

Since this decision no attempt, with force or vigor enough in it to take it to the Court of Appeals, has been made to declare the law unconstitutional in any of its phases.

A considerable amount of work was involved after this on the part of this department from the fact that after the decision of this case, those who had openly sold the goods prior to this time in the belief that the law would be declared unconstitutional ceased to sell them, but this class of merchants were not the only ones handling oleomargarine and its kindred products; there were those who were still defiant and were determined to handle the goods because there was profit in them, but were wise enough to know that it must not be done openly. To this class the attention of this department was drawn; in order to detect them in their surreptitious sales we were obliged to keep a close surveillance

upon all places where such goods would be likely to be sold and also upon the transportation lines over which they would be apt to come in seeking markets in this State.

Our efforts and litigations proved effectual so that dealers in butter in this State very soon abandoned entirely the handling of these imitation goods.

This we became aware of, and we also became aware of the further fact that these goods in small quantities still continued to come into this State. After some labor to ascertain why they should continue to come, when none of the goods could be found on sale in the stores, we discovered that agents of the manufacturers were canvassing the hotels, boarding-houses, restaurants and other places of public entertainment and selling their goods directly to the places where they were to be consumed.

To remedy this difficulty the Legislature passed chapter 140 of the Laws of 1891, amending section 27 of chapter 183 of the Laws of 1885, as added thereto by section 1 of chapter 583 of the Laws of 1887; the following is the law above referred to:

§ 27. No keeper or proprietor of any bakery, hotel, tavern, boarding-house, restaurant, saloon, lunch counter, or place of public entertainment, or of any place where any person or persons, in the employ of the keeper or proprietor thereof, is furnished with board, either without charge or as compensation wholly or in part for his services, or any person having charge thereof or employed thereat, shall keep, use or serve therein, either as food for their guests, boarders, patrons, customers, or for cooking purposes, any article made in violation of the provisions of section seven of this act, as amended by chapter five hundred and seventy-seven of the laws of eighteen hundred and eighty-six. This section shall not be so construed as to require evidence of a willful or intentional violation thereof. Whoever violates the provisions of this section shall be guilty of a misdemeanor and punished by a fine of not less than fifty dollars nor more than two hundred dollars, or not less than ten days or more than thirty days imprisonment for the first offense, and by imprisonment for one year for each subsequent offense.

Since the enactment of this statute our work with reference to oleomargarine in this State has been to prevent its use in places of public entertainment, which makes the work essentially detective. It is somewhat expensive, to say nothing of the time it

takes, to investigate the boarding-houses with reference to the material being furnished upon the tables. As it is necessary that the material should be taken as it has been actually served to the guests, our expert or agent himself has to become a guest or inmate of the place to ascertain the material furnished.

During the fiscal year ended September 30, 1892, there has been no oleomargarine sold or used in the State outside the cities of New York and Brooklyn in violation of the statutes, unless it has been sold quite clandestinely. The manufacturers or dealers have, apparently, during the past year, labored harder and with better success in inducing the proprietors of places of public entertainment in these cities to use simulated butter upon their tables, as we have obtained the evidence against fifty-seven different parties violating the law, all of whom have been prosecuted.

It may be fairly said that the enforcement of the State laws against the production and sale of simulated dairy products has produced the great result of reducing the consumption of oleomargarine and kindred products in this State from 15,000,000 pounds per year to practically nothing.

Assistant Commissioner Van Valkenburgh's report, attached hereto, shows that this year the receipts of eastern butter in New York city has increased by 1,361,850 pounds and that seven-eighths of this was manufactured in New York State. The same report shows that the receipts of western butter in that city for the same period of time have decreased by 7,995,600 pounds.

Whatever course of reasoning may be indulged in to account for this condition, the fact remains that State butter has increased its receipts by over 1,000,000 pounds during the last year in our largest city and at the same time the western product has decreased by a much larger quantity. At the same time the receipts of western cheese increased 1,404,560 pounds.

Those who are interested in getting this material before the consumer are not unmindful of the fact that tact and finesse are essential to business success and that public sentiment is not to be ignored in their calculations. It is remarkable that on occasions and at times, too numerous to be contemplated with equanimity

by those who are familiar with the trend of affairs and acquainted with the earmarks that precede and indicate new or more extended movements, persons who would resent the accusation that they were in sympathy with producers of these imitation goods, give public expression to sentiments well calculated to allay the public mind as to any fears entertained concerning these goods and which at the same time tend to throw discredit upon the propriety of maintaining a power to compel their exhibition and sale in their true character. To belittle any danger that threatens the public is not within the province of progressive citizenship. I admire the zeal often exhibited by those who are actively engaged in advancing a good cause, but do not understand why it is necessary or wise in such persons to destroy or help destroy the work or results in other directions simply because they do not happen to be cognizant of the good that is in them. He who essays to judge should first examine critically, otherwise his judgment should have but little weight. In this great State in which we have one-tenth of all the milch cows in the United States all the progressive good cannot be obtained for the people by exhausting the endeavors in one, and only one, direction.

This the Legislature has appreciated as is evidenced by the fact that it provided, not only that butter and cheese producers might be educated to produce a good article for the market, but, also, provided that the consumer should not be imposed upon and deceived by imitation articles, thus keeping a market for that better product which we are striving to produce.

There is no question but what the butter now made in New York State is genuine and free from adulteration. The laws in this State against the simulation of dairy products have been enforced so that the consumers are receiving what they purchase, so far as the nature of the product is concerned.

The oleomargarine market of over 15,000,000 pounds per year in this State has disappeared, and the 6,000,000 consumers are the ones benefited, while the producers of honest products receive the incidental benefit that any honest producer receives from the suppression of the fraudulent.

MILK.

Provision was made by chapter 202 of the Laws of 1884, against the sale, offering for sale, or the supplying or bringing to any butter or cheese manufactory adulterated, unclean, or impure milk. These laws have been amended, from time to time, as to the skimmed-milk feature and as to the manner of taking samples for analysis so that the law, as it now stands, is as follows:

Section 1. No person or persons shall sell, or exchange, or expose for sale, or exchange, any unclean, impure, unhealthy, adulterated or unwholesome milk, or shall offer for sale, any article of food made from the same, or cream from the same. The provisions of this section shall not apply to skimmed milk sold for use in the county in which it is produced, and in the adjoining counties, except in New York and Kings counties (where it shall apply) provided it is sold for and as such. This provision shall not apply to pure skim-cheese made from milk which is clean, pure, healthy, wholesome and unadulterated, except by skimming. Whoever violates the provisions of this section is guilty of a misdemeanor, and shall be punished by a fine of not less than twenty-five dollars nor more than two hundred dollars, or by imprisonment of not less than one month or more than six months, or by both such fine and imprisonment, for the first offense; and by a fine of not less than fifty dollars nor more than four hundred dollars, or by imprisonment of not less than one month nor more than six months, or by both such fine and imprisonment, for a second offense, and for a third or any subsequent offense by a fine of not less than two hundred dollars and imprisonment not less than thirty days and not exceeding three months.

§ 2. No person shall keep cows for the production of milk for market, or for sale or exchange, or for manufacturing the same, or cream from the same, into articles of food, in a crowded or unhealthy condition, or feed the cows on food that is unhealthy, or that produces impure, unhealthy, diseased or unwholesome milk. No person shall manufacture from impure, unhealthy, diseased or unwholesome milk, or of cream from the same, any article of food. Whoever violates the provision of this section is guilty of a misdemeanor, and shall be punished by a fine of not less than twenty-five dollars, nor more than two hundred dollars, or by imprisonment of not less than one month or more than four months, or by both such fine and imprisonment for the first offense, and by four months' imprisonment for each subsequent offense."

§ 3. No person or persons shall sell, supply or bring to be manufactured to any butter or cheese manufactory any milk

diluted with water or any unclean, impure, unhealthy, adulterated or unwholesome milk, or milk from which any cream has been taken (except pure skim-milk to skim-cheese factories) or shall keep back any part of the milk commonly known as 'strippings,' or shall bring or supply milk to any butter or cheese manufactory that is sour (except pure skim-milk to skim-cheese factories). No butter or cheese manufactories, except those who buy all the milk they use, shall use for their own benefit, or allow any of their employes or any other person to use for their own benefit, any milk, or cream from the milk, or the product thereof, brought to said manufactories without the consent of the owners thereof. Every butter or cheese manufacturer, except those who buy all the milk they use shall keep a correct account of all the milk daily received, and of the number of packages of butter and cheese made each day and the number of packages and aggregate weight of cheese and butter disposed of each day, which account shall be open to inspection to any person who delivers milk to such manufacturer. Whoever violates the provisions of this section shall be guilty of a misdemeanor, and shall be punished for each offense by a fine of not less than twenty-five dollars or more than two hundred dollars, or not less than one month or more than six months' imprisonment, or both such fine and imprisonment.

§ 16. When any officer authorized by this act to inspect milk offered for sale shall, in the discharge of his duties, take a sample of milk for purposes of analysis, it shall be his duty to take duplicate samples thereof, in the presence of at least one witness, and he shall in the presence of such witness seal both of said samples, and shall tender, and if accepted, deliver at the time of such taking, one sample to the vendor of said milk, or to the person having the custody of the same, with a statement in writing of the cause of the sample having been taken. In all prosecutions under this act relating to the manufacture and sale of unclean, impure, unhealthy, adulterated or unwholesome milk, if the milk be shown to contain more than eighty-eight per centum of water or fluids, or less than twelve per centum of milk solids, which shall contain not less than three per centum of fat, it shall be declared adulterated; and milk drawn from cows within fifteen days before and five days after parturition, or from animals fed on distillery waste, or any substance in the stage of fermentation or putrefaction, or upon any unhealthy food whatever, shall be declared unclean, unhealthy, impure and unwholesome milk. This section shall not prevent the feeding of ensilage.

When this department was organized, and set about enforcing the statutes against adulterated milk, the law was the same as it now is with the following exceptions: At that

time the law did not permit the sale of any milk coming below the standard except to skim-cheese factories, while now under the law skim-milk can be sold, except in the cities of New York and Brooklyn, in the county where it is produced, and in an adjoining county, providing it is sold for and as such, and is pure, clean, wholesome and unadulterated except by skimming.

At that time when the agents of this department took a sample of milk for the purpose of analysis they did not have to take it in the presence of a witness nor to deliver a duplicate sample to the vendor or person in charge stating the reasons why the sample was taken; this they have to do now when taking a sample for analysis. This provision of the law was enacted for the purpose of giving the person who might be arrested or prosecuted a chance to have a sample of exactly the same kind of milk taken by our agents analyzed by a chemist for the purpose of defense.

At first our operations in the milk work were turned in the direction of the supply of milk being transported to and sold for consumption in the great cities; as the facilities of the department increased we broadened our work, extending it to the smaller cities and villages, butter and cheese factories of the State.

To keep a surveillance over the great amount of milk sold for consumption to at least 5,000,000 persons is a work of no mean proportions. There are thirty-two cities in the State depending almost entirely for their supply upon milk produced and shipped from the rural districts. In addition to this there are nearly 2,000 butter and cheese factories to which milk is delivered daily during the butter and cheese-making season. The great problem that presented itself to this department was how to direct the force at our command so as to reduce the evils relative to milk adulteration to the minimum in the least possible time with the least possible expense and yet have it effective.

As we entered into this work we discovered the enormous proportions of the adulteration and were surprised to find that from seventy-five to ninety per cent of all the milk sold was adulterated.

It is safe to say that that part of the milk was adulterated to the extent of at least twenty-five per cent, it being mostly adulterated with water. This is with reference to milk that was sold for consumption.

Under the law it is a misdemeanor to sell, or expose for sale, milk containing more than eighty-eight per cent of water, or less than twelve per cent of solids, or less than three per cent of butter fat; that is, the law provides that such milk shall be declared adulterated milk.

A law providing a standard below which milk should not be sold upon the market was a new departure in this State and naturally caused some inquiry and excited quite a little opposition on the ground that it was, or might prove, injurious under some circumstances to innocent men. It was claimed by its advocates that the standard was fixed at the lowest possible grade of pure milk drawn from healthful cows, properly fed and cared for.

During the year 1884, I caused an inquiry to be made into this question, and presented in my first annual report the result of the investigation, which will be found at pages 57, 58 and 59 of that report, as follows:

PERCENTAGE OF CONSTITUENTS IN AVERAGE MILK.

In order to detect the adulteration of milk by the addition of water or by the removal of cream, it becomes of great importance to determine whether the constituents of average milk vary between certain limits, and what these limits are.

The constituents vary, and more especially the fatty matter, according to age, breed, time before or after calving, the quality of the food, condition of the animal, etc. But even taking into consideration these facts, we find that nature in its endeavor to produce a healthy food for the young, will, in a great measure, overcome surroundings which are most antagonistic to the production of healthy milk.

So much has been done to determine what the standard is, below which pure, healthy milk never falls, that we know now with absolute certainty that the variation in the constituents of average milk is between certain well-defined limits.

The following tables, prepared from analyses of many investigations, and, as will be seen, from a very large number of cows, and from all parts of the world, show most conclusively what the limit or standard of purity is.

NINTH ANNUAL REPORT OF THE

AUTHORITY OR ANALYST.	Number of cows.	Water.	Total solids.	Fat.	Solids not fat.	Sugar.	Casein.	Salts.
James Bell	216	87.17	12.83	3.83	9.00	.....	.....	0.71
James Bell	24 dairies	86.78	13.22	4.12	9.10	.....	.....	0.72
C. Estecourt.....	22 dairies	87.26	12.74	3.37	9.37	.....	.....	.....
J. Carter Bell.....	183	86.40	13.60	3.70	9.90	.....	.....	0.76
J. Cameron	42	86.53	13.47	4.00	9.47	.....	.....	.....
C. Cameron	40	87.00	13.00	4.00	9.00	4.28	4.10	0.62
C. Cameron	100	86.75	13.85	4.60	9.25	.....	.....	.....
Fleischmann & Veith.....	120	87.78	12.22	3.20	9.02	.....	.....	.....
Veith	60	87.20	12.80	3.10	9.70	.....	.....	.....
Veith	9,120	86.97	13.03	3.52	9.51	.....	.....	.....
Wanklyn	Average	87.50	12.50	3.20	9.30	.....	.....	.....
A. Winter Blyth.....	Average	86.87	13.13	3.50	9.63	.....	.....	.....
Marchand	Average	87.15	12.85	3.55	9.30	.....	.....	.....
Henry & Chevalier.....	Average	87.02	12.98	3.13	9.85	4.77	4.48	0.60
Vernois Becquerel.....	Average	86.40	13.60	3.60	10.00	.....	.....	.....
Payen	Average	86.60	13.40	3.50	9.90	.....	.....	.....
O. C. Wiggin.....	58	85.92	14.08	4.01	10.07	4.29	4.99	0.79
E. Calder	27	87.23	12.77	3.32	9.45	.....	.....	.....
Sharpless.....	34	85.85	14.15	4.62	9.53	4.82	4.06	0.65
Haidlen	Average	87.30	12.70	3.00	9.70	.....	.....	.....
Letherby.....	Average	86.00	14.00	3.90	10.10	5.20	4.10	0.80
J. Konig.....	Average	87.30	12.70	3.00	9.70	5.00	4.00	0.70
Boussingault	Average	87.40	12.60	4.10	8.50	5.10	3.20	0.70
Muspratt.....	Average	86.43	13.57	4.43	9.14	4.73	3.74	0.67
Diculafait.....	Average	87.64	12.36	3.11	9.25	4.22	4.18	0.85
Group Bezanaz	Average	85.70	14.30	4.31	9.99	4.04	5.40	0.55

Brinton	Average	86.00	14.00	4.50	9.50	3.50	5.50	0.70
Chandler	1,700 qts	87.45	12.55	3.83	8.72	.....	.....	.....
Newton	Average	87.50	12.50	3.50	9.00	.....	.....	.....
Bartley	Average	87.50	12.50	3.50	9.00	.....	.....	.....
White	Average	87.50	12.50	3.50	9.00	.....	.....	.....
Waller	Average	87.50	12.50	3.20	9.30	.....	.....	.....
Babcock	Average	85.53	14.47	5.09	9.39	5.15	3.57	0.67
Church	Average	86.30	13.70	3.70	10.00	5.10	4.10	0.80
Edward Smith	Average	86.40	13.60	3.61	9.90	3.80	5.52	0.66
Martin	Average	86.50	12.50	3.20	9.30	.....	.....	0.67

The following table will show the result of the analyses of milk from herds in various sections of this State. All of the samples were milked in the presence of an inspector and delivered to me in the same condition as when taken from the cow:

NUMBER OF COWS.	Water.	Fat.	Casein and sugar.	Salts.	Solids not fat.	Total solids.	Number of inspection and analysis.
40	87.47	3.29	8.57	0.67	9.24	12.53	D 1504
28	87.34	3.33	8.56	0.67	9.23	12.66	D 1513
10	86.98	3.62	8.72	0.68	9.40	13.02	B 2561
1	87.05	3.40	8.92	0.63	9.55	12.95	B 2526
27	87.03	3.80	8.48	0.69	9.17	12.97	D 1585
1	84.71	3.79	10.81	0.69	11.50	15.29	B 2690
10	86.85	3.58	8.89	0.68	9.57	13.15	B 2694
11	87.34	3.44	8.52	0.70	9.22	12.66	D 1595
27	86.97	3.33	8.90	0.80	9.70	13.03	D 1666
1	84.47	6.24	8.48	0.71	9.29	15.53	B 2762
24	85.82	4.80	8.66	0.72	9.38	14.18	B 2772
14	86.67	3.49	9.12	0.72	9.84	13.33	B 2788
20	86.38	4.45	8.56	0.71	9.27	13.62	E 5
20	82.10	8.31	8.80	0.79	9.59	17.90	D 1703
31*	86.19	4.64	8.40	0.77	9.17	13.81	C 1854
31†	86.88	3.90	8.45	0.77	9.22	13.12	C 1855

If, then, we assume that in healthy, normal cow's milk there should be not more than 87.5 per cent of water, 3.2 per cent of fat, 9.3 per cent of solids, not fat, and 12.5 per cent of total solids, we are certainly well within the limits.

It will be noticed that in the table above given as the result of the analyses of pure milk made by the different chemists of milk taken from different herds of cattle, that no sample of them all contained more than 87.50 per cent of water nor less than 12.50 per centum total solids, and none of them contained less than 3.2 per cent of fat, so that, if the result of the investigation was to have any weight at all it indicated that pure milk drawn from healthy cows properly fed and cared for would not have more than 87.50 per cent water or less than 12.50 per cent milk solids or less than 3.2 per cent fat, whereas the law allowed considerable

* Morning's milk.

† Evening's milk.

leeway in each one of these three ingredients found in milk, namely, it allowed 88 per cent of water, and only required 12 per cent total solids and 3 per cent fat. In the year 1885, following the time above referred to in which we investigated this question, there were a great many cases made in the State; among them there were thirty-nine brought in the city of Albany, all made at about the same time. Informations were laid before the police justice of that city; in each case the defendant pleaded not guilty; they pooled their issues and decided to try one of the cases, namely, that brought against one Arthur Cipperley. In that case the chemical analysis showed that the milk contained 88.096 per cent of water and 2.656 per centum of fat. Bail was given by the defense to appear before the Court of Special Sessions; in that court but one case, the People against Cipperly, was tried. Mr. Cipperley was convicted and fined twenty-five dollars.

He appealed from the decision of the court of Special Sessions to the General Term of the Supreme Court, and that court reversed the decision of the court of Special Sessions, declaring the law unconstitutional, on the ground that it was not within the power of the Legislature to provide that milk, when sold upon the market containing more than eighty-eight per cent water, etc., was adulterated and unwholesome; that such law created a conclusive rule of evidence, binding upon the defendant, prohibiting him from introducing any evidence in defense, to show that he had not adulterated the milk, and that it had not in fact been adulterated. Mr. Justice Learned, of the General Term of the Supreme Court, wrote a dissenting opinion in which he said, in substance, that such a law did not create a conclusive rule of evidence, but that it created a standard below which milk should not be sold upon the market, and that it was within the power of the Legislature to determine the grade of milk below which it should not be sold for consumption. The people appealed from the decision of the General Term to the Court of Appeals; that court reversed the decision of the General Term, adopting the opinion of Judge Learned as their opinion. By that decision, the law, creating a standard below which milk be declared impure

and adulterated, and below which it should not be sold upon the market for consumption, was declared constitutional.

Immediately thereafter, the thirty-eight other defendants above referred to, pleaded guilty and paid their fines in the court of Special Sessions in the city of Albany.

During the year 1885, in the city of Buffalo, one Vandenberg, an agent and chemist for this department examining milk in the grocery stores of that city, took a sample in the store of one Kibler. Upon chemical analysis it showed 89.04 per cent of water and 7.78 per cent milk solids. Defendant Kibler was indicted by the grand jury of Erie county for wrongfully and unlawfully selling to Frank Vandenberg one pint of unclean, impure, unhealthy and adulterated milk, contrary to the statute in such cases made and provided. Defendant was tried in the Court of Sessions and convicted; from that conviction he appealed to the General Term of the Supreme Court where the decision of the Court of Sessions was affirmed, and defendant then appealed to the Court of Appeals and that court affirmed the conviction.

In this case the same principle was involved as in the case of the People against Cipperly. The court held that under the act of 1885, chapter 183, providing against the sale of adulterated milk, criminal intent forms no part or element of the offense; that all that was required to establish this offense was to show the sale of milk falling below the standard fixed by the act and coming within its definition of adulterated milk. That if the sale was of skim-milk, that was a matter of defense, being a fact peculiarly within the knowledge of defendant.

The case was decided July 1, 1887, so that at this time the constitutionality of the law had been twice called in question before the Court of Appeals, and both times upheld. It now became a question of enforcing the law which had been held valid. Our efforts in the western part of the State were productive of great good. We had been at work in the city of Rochester scarcely a year when the milk which supplied the city had to be gathered from a distance of twenty-five to fifty miles further from the city than it had prior to our commencing work there.

Such a change can bear but one interpretation, namely, that the enforcement of the laws necessitated more pure milk than the former territory produced.

What was true of that city was true of others. The milk producing territory is larger in this State to-day than it has ever been before. To illustrate: During the year 1885, the receipts of crude milk in New York city were 4,930,459 cans of forty quarts each, while the receipts in the same city for the year 1892 were 7,040,342 cans of forty quarts each.

Many deductions might be made from statistics of the receipts of milk in the different cities in the State during the last decade, but I deem it sufficient to call attention to the following facts: That milk adulteration in this State has been reduced to such a degree as to make the milk delivered to the consumer practically pure; that the territory in which the milk is produced for consumption in our cities has been greatly enlarged and the quantity of milk shipped to those cities by the producer has greatly increased. It is hardly necessary for me to enter into any extended discussion of the matter to show that these results are beneficial or to whom they are beneficial.

The present condition of things has been produced by hard work on the part of the employes of this department. Experience teaches that if that work is neglected or not performed with certain regularity the milk sold by the middleman and retailer is of a poorer quality than when the product is under practically constant surveillance.

The reports of the assistant commissioners hereto attached and the report of the first division, including the counties of Albany, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie and Washington, show that there have been 115 milk cases brought by the department during the year. This is a great decrease in the number of prosecutions for selling adulterated milk in one year, but it is sufficient to illustrate the fact that with all the care and attention that we can possibly give to this work, there are some who will take their chances; at least 115 have taken their chances during the past year. Just how many there are who

have been kept from it by the fear of results that might follow, is, of course, a matter of conjecture, but that there are some is a fact which will hardly be questioned.

My former reports show that there were very many more who did adulterate milk, and that there was much more impure milk sold for consumption, at the time and prior to the time of the enactment of these laws than at present. I know of no other reason for the greater quantity of good milk being upon the market than that the law of the State demands it, and that that law is being enforced as fully as the means devoted to that purpose will permit. The history of the prosecutions of the cases will be found in the reports of the assistant commissioners attached hereto, with the exceptions of those made in the first division of the State which were as follows:

CASE No. 3447.

The People *v.* John Fisher.

Justice Gutmann's Police Court, Albany N. Y.

Information laid March 9, 1892. Warrant served March 12, 1892. Adjourned to March 21, 1892. Pleaded guilty, fined twenty-five dollars.

Witnesses: Charles Burke, George B. Fellows, R. D. Clark.

CASE No. 3448.

The People *v.* Leonard Creham.

Justice ————— Police Court, Albany, N. Y.

Warrant issued March 9, 1892. Answered to March 12, 1892. Adjourned to March 21, 1892. Pleaded guilty, fined twenty-five dollars.

Witnesses: Charles Burke, George B. Fellows, R. D. Clark.

CASE No. 3449.

The People *v.* Walter Doyle.

Justice Gutmann's Police Court, Albany, N. Y.

Warrant issued, March 21, 1892. Answered to March 23, 1892. Pleaded guilty, fined twenty-five dollars.

Witnesses: Charles Burke, George B. Fellows, R. D. Clark.

CASE No. 3450.

The People v. Jacob Dolch.

Justice Gutmann's Police Court, Albany, N. Y.

Warrant issued March 21, 1892 Answered to March 23, 1892.

Pleaded guilty, fined twenty-five dollars.

Witnesses: Charles Burke, George B. Fellows, R. D. Clark.

CASE No. 3451.

The People v. J. Martin.

Justice Gutmann's Police Court, Albany, N. Y.

Warrant issued May 31, 1892. Answered to June 6, 1892.

Pleaded guilty, fined twenty-five dollars.

Witnesses: Charles Burke, George B. Fellows, R. D. Clark.

CASE No. 3452.

The People v. J. M. Koch.

Justice Eisenminger's Police Court, Schenectady, N. Y.

Warrant issued —————. Answered to May 13, 1892.

Pleaded guilty, sentence suspended.

Witnesses: Charles Burke, George B. Fellows, R. D. Clark.

CASE No. 3453.

The People v. C. P. Sanders.

Justice Chadsey's Police Court, Schenectady, N. Y.

Warrant issued and served; answered to May 13, 1892; adjourned to May twentieth, to May twenty-sixth. Tried and convicted, fined twenty-five dollars.

Witnesses: Charles Burke, Geo. B. Fellows, R. D. Clark.

CASE No. 3454.

The People v. Abram Coons.

Justice Eisenminger's Police Court, Schenectady, N. Y.

Warrant issued and served; answered to May 4, 1892. Waived examination and held to bail for grand jury, at its session in September, 1892. Case presented; no indictment found.

Witnesses: Charles Burke, Geo. B. Fellows, R. D. Clark.

CASE No. 3455.

The People v. H. W. Veeder.

Justice Eisenminger's Police Court, Schenectady, N. Y.

Warrant issued; answered to May 4, 1892. Waived examination and held to bail for grand jury. At its session in September, 1892, case presented; no indictment found. Defendant was one of the grand jury.

Witnesses: Charles Burke, Geo. B. Fellows, R. D. Clark.

CASE No. 3456.

The People v. John Lindheimer.

Justice Gutmann's Police Court, Albany, N. Y.

Warrant issued and served; answered to July 11, 1892. Pleaded guilty, fined twenty-five dollars.

Witnesses: Charles Burke, Geo. B. Fellows, R. D. Clark.

CASE No. 3457.

The People v. T. H. Lansing.

Justice Grogan's Police Court, West Troy, N. Y.

Warrant issued; answered to July 19, 1892. Pleaded guilty; fined twenty-five dollars.

Witnesses: Charles Burke, Geo. B. Fellows, R. D. Clark.

CASE No. 3458.

The People v. A. Hauerwas.

Not prosecuted. He had just purchased the milk from John Lindenheimer (see case 3456).

CASE No. 3459.

The People v. C. J. Schermerhorn.

Recorder McElwaine, Recorder's Court, Cohoes, N. Y.

Warrant issued July 1, 1892; answered to July second, adjourned to July fourth, to seventh. Pleaded guilty. Fined twenty-five dollars.

Witnesses: Charles Burke, Geo. B. Fellows, R. D. Clark.

CASE No. 3460.

The People v. Nicholas Vandenburg.

Recorder McElwaine, Recorder's Court, Cohoes, N. Y.

Warrant issued July 1, 1892; answered to July 2, 1892. Pleaded guilty. Fined twenty-five dollars.

Witnesses: Charles Burke, Geo. B. Fellows, R. D. Clark.

CASE No. 3461.

The People v. C. F. Fonda.

Recorder McElwaine, Recorder's Court, Cohoes, N. Y.

Warrant issued July 1, 1891; answered to July 2, 1892. Pleaded guilty. Fined twenty-five dollars.

Witnesses: Charles Burke, Geo. B. Fellows, R. D. Clark.

CASE No. 3863.

The People v. G. W. Schermerhorn.

Recorder McElwaine, Recorder's Court, Cohoes, N. Y.

Warrant issued July 1, 1892; answered to July second; adjournment to July fourth; to July seventh. Pleaded guilty. Sentence suspended.

Witnesses: Charles Burke, Geo. B. Fellows, R. D. Clark.

CASE No. 3864.

The People v. L. O'Neill.

Justice Gutmann's Police Court, Albany, N. Y.

Warrant issued June 30, 1892; answered to July 5, 1892. Pleaded guilty. Fined twenty-five dollars.

Witnesses: Charles Burke, Geo. B. Fellows, R. D. Clark.

CASE No. 3865.

The People v. H. Pitts.

Justice Grogan's Police Court, West Troy, N. Y.

Warrant issued; answered to July 19, 1892. Pleaded guilty. Fined twenty-five dollars.

Witnesses: Charles Burke, Geo. B. Fellows, R. D. Clark.

CASE No. 3866.

The People v. J. Graffin.

Justice Grogan's Police Court, West Troy, N. Y.

Warrant issued and answered to July 19, 1892. Pled guilty.
Fined twenty-five dollars.

Witnesses: Charles Burke, Geo. B. Fellows, R. D. Clark.

CASE No. 3867.

The People v. C. L. Parse.

Not adulterated.

CASE No. 3868.

The People v. Marcus G. Coldhamer.

Justice Donahoe's Police Court, Troy, N. Y.

Warrant issued; answered to September 14, 1892; adjourned to
September 19, 1892. Pled guilty. Sentenced suspended.

Witnesses: Charles Burke, Geo. B. Fellows, R. D. Clark.

CASE No. 3869.

The People v. A. D. Whitbeck.

Justice Stephen's Police Court, Albany, N. Y.

Warrant issued; answered to September 9, 1892; adjourned to
September twelve. Pled guilty. Fined twenty-five dollars.

Witnesses: Charles Burke, Geo. B. Fellows, R. D. Clark.

CASE No. 3870.

The People v. B. Reamer.

Recorder Nichols, Recorder's Court, Cohoes, N. Y.

Warrant issued August 30, 1892; answered to September 7,
1892. Case dismissed, as defendant died.

Witnesses: Charles Burke, Geo. B. Fellows, R. D. Clark.

CASE No. 3871.

The People v. C. F. Horstmyer.

Justice Eisenminger's Police Court, Schenectady, N. Y.

Warrant issued ——— —, —; answered to November 25, 1892; adjourned to November 28, 1892. Tried and convicted. Fined twenty-five dollars.

Witnesses: Charles Burke, Geo. B. Fellows, R. D. Clark.

CASE No. 3872.

The People v. F. A. Wager.

Justice Stephen's Police Court, Albany, N. Y.

Warrant issued ——— —, —; answered to November 26, 1892; adjourned to December first. Pleaded guilty. Fined twenty-five dollars.

Witnesses: Chas. Burke, Geo. B. Fellows, R. D. Clark.

CASE No. 3874.

The People v. George Alendorf.

Justice Stephen's Police Court, Albany, N. Y.

Warrant issued ——— —, —; answered to November 26, 1892; adjourned to December 1, 1892. Pleaded guilty. Fined twenty-five dollars.

Witnesses: Chas. Burke, Geo. B. Fellows, R. D. Clark.

CASE No. 3876.

The People v. Valentine Stang.

Justice Stephen's Police Court, Albany, N. Y.

Warrant issued ——— —, —; answered to November 26, 1892; adjourned to December 1, 1892. Pleaded guilty. Fined twenty-five dollars.

Witnesses: Chas. Burke, Geo. B. Fellows, R. D. Clark.

CASE No. 3958.

The People *v.* Brand.

Justice McLean, Special Sessions, Plattsburgh, N. Y.

Warrant issued September 2, 1892; answered to September 3, 1892. Pleaded guilty. Fined twenty-five dollars.

Witnesses: Geo. L. Flanders, R. D. Clark.

CASE No. 3959.

The People *v.* Quinn.

Justice McLean, Special Sessions, Plattsburgh, N. Y.

Warrant issued September 2, 1892; answered to September 3, 1892. Pleaded guilty. Fined twenty-five dollars.

Witnesses: Geo. L. Flanders, R. D. Clark.

CASE No. 3960.

The People *v.* Bridges.

Justice McLean, Special Sessions, Plattsburgh, N. Y.

Warrant issued September 2, 1892; answered to September 3, 1892. Pleaded guilty. Fined twenty-five dollars.

Witnesses: Geo. L. Flanders, R. D. Clark.

CASE No. 3961.

The People *v.* Hugh Collins.

Justice Hartwick, Special Sessions, Salem, N. Y.

Warrant issued September 28, 1892. Pleaded guilty. Fined twenty-five dollars.

Witnesses: Simon Nusbaum, R. D. Clark.

CASE No. 3962.

The People *v.* Jane Kerslake.

Justice Hartwick, Special Sessions, Salem, N. Y.

Warrant issued September 28, 1892; adjourned to October 3, 1892. Pleaded guilty. Fined twenty-five dollars.

Witnesses: Simon Nusbaum, R. D. Clark

CHEESE.

The Legislature of 1885 provided by chapter 193 of the Laws of that year, as follows:

Section 1. Section seven of chapter 202 of the Laws of 1884, entitled "An act to prevent deception in sales of dairy products," is hereby amended to read as follows:

§ 7. No person shall offer, sell or expose for sale, butter or cheese, branded or labeled with a false brand or label as to the quality of the article, or the county or State in which the article is made. The New York state dairy commissioner is hereby authorized and directed to procure and issue to the cheese manufactories of the State upon proper application therefor and under such regulations as to the custody and use thereof as he may prescribe, a uniform stencil brand bearing a suitable device or motto, and the words "New York State full-cream cheese." Every brand issued shall be used upon the outside of the cheese and also upon the package containing the same, and shall bear a different number for each separate manufactory, and the commissioner shall keep a book in which shall be registered the name, location and number of each manufactory using said brand, and the name or names of the person at each manufactory authorized to use the same. It shall be unlawful to use or permit such stencil brand to be used upon any other than full cream cheese or packages containing the same. Whoever violates the provisions of this section is guilty of a misdemeanor, and for each and every cheese or package so falsely branded, shall be punished by a fine of not less than twenty-five dollars or more than fifty dollars or imprisonment of not less than fifteen or more than thirty days.

§ 2. This act shall take effect immediately.

Under the provisions of the above law, a brand was provided and proper blanks and regulations prepared. During the first year, 1885, there were issued upon application, brands to 452 different manufactories, during the succeeding years other factories have applied for and had brands assigned to them until there have been brands assigned to 1,566 different cheese manufactories.

These brands are not all in use, necessarily, during each cheese making season, but a brand having once been assigned to a factory, that number is reserved and issued to no other. During the season of 1892, brands have been in actual use in the following factories, viz.:

ALLEGANY COUNTY.

NAME OF FACTORY.	Applicant.	Post office.
Alfred	E. P. Fenner	Alfred.
Alfred Centre	Alvin C. Baker	Alfred Centre.
Allen	J. R. Lamont	Belfast.
Allentown	Riley Allen	Allentown.
Andover	W. F. Snyder	Andover.
Angelica Union	W. L. Hogg	Angelica.
Baker	James A. Baker	Angelica.
Barr	J. P. Barr	Friendship.
Belfast	A. E. Perry	Belfast.
Belfast No. 4	A. E. Perry	Belfast.
Bishopville	A. L. McIntosh	Bishopville.
Black Creek	M. J. Dunn	Black Creek.
Brookside	M. E. Gordon	Rushford.
Caneadea	Young & Young	Fillmore.
Clarksville Centre	M. M. Congdon	West Clarksville.
County Line	Young & Young	Fillmore.
Cryder Creek	G. H. Harris	Cuba.
Cuba Village	A. S. Thompson	Cuba.
Deyden Ridge	John L. Coyle	Andover.
East Friendship	W. L. Dayton	Friendship.
East Hill	E. B. Jewell	Caneadea.
East Valley	T. G. Brown	Andover.
Empire	W. E. Child	State Road.
Fillmore	Young & Young	Fillmore.

Five Corners.....	E. O. Fenner & Son.....	Alfred.
Ford Brook.....	Fred Carpenter.....	Standards Corners.
Forest.....	Will. H. Reid.....	Obi.
Genesee Valley.....	Fred H. Rice.....	Friendship.
Gilt Edge.....	F. J. Brown.....	Belmont.
Gynn.....	Snyder Bros.....	Andover.
Halls, A. E.....	A. E. Hall.....	Scio.
Hardys.....	J. G. James.....	Rushford.
Houghton.....	Peter Loftis.....	Houghton.
Hume.....	Young & Young.....	Fillmore.
Hunts.....	Young & Young.....	Fillmore.
Independence.....	Chas. F. Potter.....	Independence.
Jasper.....	T. J. Carmody & Co.....	Cuba.
Karrdale.....	Walter McHenry.....	Karrdale.
Keller Hill.....	F. B. Reynolds.....	Cuba.
Kellogg.....	Orem Edson.....	Rushford.
Keystone.....	M. H. Crofoot.....	Aristotle.
Lafferty.....	James Loftus.....	Black Creek.
Little Genesee.....	C. A. Thompson.....	Little Genesee.
McGrawville.....	F. W. Hogg.....	New Hudson.
McHenry Valley.....	E. P. Fenner.....	Alfred.
Marshall.....	J. R. McVey.....	Marshall.
Mills Mills.....	R. L. Boller.....	Hume.
Mount Monroe.....	J. G. James.....	Rushford.
Murray.....	Bernard Murray.....	Andover.
New Hudson Centre.....	Edwin S. Moses.....	New Hudson.
Oramel.....	A. E. Perry.....	Belfast.
Phillips' Creek.....	Ockerman & Fuller.....	Phillips' Creek.
Piatt.....	Fred R. Piatt.....	Short Tract.

ALLEGANY COUNTY — (Concluded).

NAME OF FACTORY.	Applicant.	Post-office.
Pleasant Valley	H. G. Edwards	Alfred
Pleasant Valley	O. J. Folts	Cuba.
Podonque	J. G. James	Rushford
Rice	Herman Rice	Friendship.
Richburgh	S. A. Brown	Richburgh.
Rockville	A. E. Perry	Belfast.
Rush Creek	C. K. Farnsworth	Fillmore.
Scio No. 1	Gilbert Bliven	Scio.
Sherman	F. M. Sawyer	Inavale.
Shongo	R. C. Alsworth	Shongo.
Short Tract	Young & Young	Fillmore.
Slater Creek	E. E. Swain	Canaseraga.
Smith	Burt Robinson	Bolivar.
South Andover	John L. Coyle	Andover.
South Bolivar	J. R. Brown	South Boliver.
South Cuba	George S. Marsh	Cuba.
South Nile	Costello & Wyant	Friendship.
Spring Brook	M. J. Sands	Cuba.
Spring Mills	C. H. Austin	Spring Mills.
Star	D. M. Hancock	Centerville.
Stone Spring	John H. Boller	Hume.
Trapping Brook	S. B. Carpenter	Wellsville.
Union	Young & Young	Fillmore.
Vandemark No. 1	G. E. Dodge	Scio.

Vandemark No. 2.....	Willard A. Dodge.....	Scio.
West Almond.....	Jay Cartwright.....	West Almond.
West Hill.....	Eugene Huff.....	Caneadea.
West Nile.....	Costello & Wyant.....	Friendship.
White Creek.....	Warren E. Wilkinson.....	Belfast.
Wildman.....	J. H. Wood.....	Whitesville.
Wiscoy.....	Young & Young.....	Fillmore.
Woodhull.....	T. J. Carmody & Co.....	Cuba.

BROOME COUNTY.

Chenango.....	G. H. Littlewood.....	Lisle.
Holcomb.....	S. A. Holcomb.....	Tunnel.
Port Crane.....	S. Mills Ely.....	Binghamton.

CATTARAUGUS COUNTY.

Abbey.....	A. E. Day.....	South Dayton.
Abbott Union.....	John Hoag.....	Abbotts.
Ashford.....	J. R. Zetwick.....	Ashford.
Axville.....	O. S. Wright.....	East Randolph.
Beardsley.....	A. E. Day.....	South Dayton.
Bellows.....	A. B. Neff.....	Ashford.
Block.....	E. L. Jones.....	Yorkshire Cen.
Bullock.....	Geo. E. Hogg.....	Franklinville.
Campbell Hill.....	E. L. Jones.....	Yorkshire Cen.
Cattaraugus No. 1.....	F. Hufstader & Co.....	Little Valley.
Centerville.....	E. L. Jones.....	Yorkshire Cen.
Champtin.....	W. M. Champtin.....	Little Valley.
Cottage.....	James Poland.....	Cottage.

CATTARAUGUS COUNTY — (Continued).

NAME OF FACTORY.	Applicant.	Post-office.
Dayton.....	O. W. Catlin.....	Dayton.
Demmons	E. L. Jones.....	Yorkshire Cen.
Eagle	J. Gampp.....	East Otto.
Eagle Village	Clark & Metcalf	Rawson.
East Leon.....	Albert Howard.....	East Leon.
East Machias.....	C. F. Smith	Machias.
East Otto.....	J. Gampp.....	East Otto.
East Otto Union No. 5.....	Joseph Dorsey.....	East Otto.
East Otto Union No. 6.....	C. A. Facklam.....	Cattaraugus.
Elgin.....	O. A. Chase.....	Elgin.
Elm Creek.....	D. A. Cowan.....	East Randolph.
Farmersville	C. E. Wright.....	Laidlaw.
Fay Hollow.....	E. C. Alsworth	Hinsdale.
Five-Mile Union.....	C. D. Bennett	Allegany.
Five Points.....	F. Hufstader & Co	Little Valley.
Freedom	S. J. Owens	Freedom.
Haskell Flats	Peter J. Pettit.....	Haskell Flats.
Highland	W. A. Hopkins	Conewango.
Hopkins, I. M.....	I. M. Hopkins	Portville.
Irish Hill.....	A. B. Neff.....	Ashford.
Java Lake	E. L. Jones.....	Yorkshire Cen.
Lime Brook.....	E. T. Ryder.....	Otto.
Lime Brook No. 1.....	P. F. Jark.....	Otto.
Lime Brook No. 2.....	P. F. Jark.....	Otto.

Lime Brook No. 3.....	P. F. Jark.....	Otto.
Lime Brook No. 4.....	P. F. Jark.....	Otto.
Little Valley Centre	E. D. Morey.....	Elkdale.
Little Valley No. 4	F. Hufstader & Co.....	Little Valley.
Lower Haskell.....	Jas. J. Kirby.....	Olean.
Marble Spring.....	E. D. Mainwaring.....	Elton.
Maynard	J. Gampp.....	East Otto.
McKinstry	E. L. Jones.....	Yorkshire Cen.
Napoli No. 5.....	F. Hufstader & Co.....	Little Valley.
North Arcade.....	E. L. Jones.....	Yorkshire Cen.
North Leon No. 1.....	A. D. Ackler.....	Leon.
North Leon No. 2.....	A. D. Ackler.....	Leon.
North Napoli	Eben Sibley.....	Napoli.
North Otto Union	Samuel Charlesworth.....	Otto.
North Valley.....	Wm. C. Eddy.....	Little Valley.
Onoville.....	Ira & C. P. Marsh.....	Onoville.
Perrysburgh.....	Robert C. McCubbin.....	Perrysburgh.
Pike Centennial.....	E. L. Jones.....	Yorkshire Cen.
Plato Union	A. B. Neff.....	Ashford.
Pritchard.....	E. C. Pritchard.....	Cattaraugus.
Randolph No. 1.....	Zenas Carpenter.....	East Randolph.
Randolph No. 2.....	E. V. Carpenter.....	Randolph.
Randolph No. 3.....	Samuel Carpenter	Randolph.
Randolph No. 4.....	W. Carpenter & Son	East Randolph.
Randolph No. 5.....	Herman Ferrier	Conewango.
Rawson	F. M. Metcalf	Rawson.
Riceville	A. B. Neff.....	Ashford.
Rock Spring No. 1.....	J. R. Holden	Franklinville.
Rock Spring No. 2.....	J. R. Holden	Franklinville.

CATTARAUGUS COUNTY — (Concluded).

NAME OF FACTORY.	Applicant.	Post-office.
Rock Spring No. 3.....	J. R. Holden	Franklinville.
Rock Spring No. 4.....	J. R. Holden	Franklinville.
Ross No. 1.....	Asa Ross & Co	Gowanda.
Ross No. 2.....	Asa Ross & Co	Gowanda.
Sandusky No. 2.....	J. B. Lewis.....	Sandusky.
Schmertze	A. B. Neff.....	Ashford.
Scott's Corners.....	C. B. Alsworth.....	Hinsdale.
Smith's Mills.....	Robert McCubbin.....	Perrysburgh.
South Ashford	Henry Jenkel.....	West Valley.
Spring Brook No. 1.....	C. J. Busekist.....	New Albion.
Spring Brook No. 2.....	Henry Detman.....	Leon Centre.
Spring Valley.....	W. T. Peaslee & Son	East Randolph.
Stebbins Hill No. 3.....	F. Hufstader & Co.....	Little Valley.
Stone.....	S. M. Fisher.....	Franklinville.
Studley	J. A. Studley.....	East Ashford.
Ticknor.....	Robert McCubbin.....	Perrysburgh.
Union.....	J. Gampp.....	East Otto.
Van Brunt.....	Andrew Van Brunt.....	Portville.
Vedder Corners.....	John M. Zeilman	Ashford.
West Valley No. 1.....	J. D. Frank	West Valley.
West Yorkshire.....	E. L. Jones.....	Yorkshire Cen.
Willson No. 1	Z. A. Willson	Ischua.
Willson No. 2	Z. A. Willson	Ischua.

Yorkshire.	E. L. Jones.	Yorkshire Centre.
Yorkshire Centre No. 1.	E. L. Jones.	Yorkshire Centre.
Yorkshire Centre No. 9.	E. L. Jones.	Yorkshire Centre.

CHAUTAUQUA COUNTY.

Alden	A. D. Alden	Sinclairville.
Arkwright Centre	Frank W. Horton	Arkwright.
Arkwright Union	Cyrus B. Wilson	Fredonia.
Arkwright Valley	A. J. Cowden	Laona.
Blockville	G. H. Burlage	Harmony.
Card	H. C. Card	Clymer.
Charlotte Centre	F. L. Clark	Charlotte Centre
Charlotte Union	B. G. Erwin	Sinclairville.
Chautauqua Hill	N. G. Goldthwait	Hartfield.
Climax	Miles Mackey	Fluvanna.
Cold Spring	W. Scriven	Hartfield.
Cutting Brook	H. R. Case	Cutting.
Ellery	George Barnes	Ellery.
Ellington No. 1	E. F. Rowley	Kennedy.
Ellington No. 2	E. F. Rowley	Kennedy.
Ellington No. 3	E. F. Rowley	Kennedy.
Ellington No. 4	E. F. Rowley	Kennedy.
Ellington No. 5	E. F. Rowley	Kennedy.
Ellington No. 6	E. F. Rowley	Kennedy.
Empire	John McAdam	Forestville.
Forestville	John McAdam	Forestville.
Forestville Branch	John McAdam	Forestville.
Grant	J. J. Colwell	Broken Straw.

CHAUTAUQUA COUNTY — (Concluded).

NAME OF FACTORY.	Applicant.	Post-office.
Goshen.....	James Pardee.....	Bear Lake, Pa.
Laona.....	S. G. Bartlett	Laona.
Lewis.....	S. W. Lewis.....	Stockton.
Limwood No. 1.....	C. D. Leonard.....	Cherry Creek.
Limwood No. 3.....	C. D. Leonard.....	Cherry Creek.
Lombard	W. T. Green	Sherman.
Mayville.....	M. T. Wakefield.....	Mayville.
Morgans Corners.....	J. I. Parkhurst	Clymer.
Moons.....	Mallory & Thompson	Moons.
Nashville	Columbus Montgomery.....	Nashville.
Sheridan	John McAdam	Forestville.
Stockton	H. B. Van Buren	Stockton.
Torrey	S. Torrey	Sinclairville.
Warner	S. Torrey	Sinclairville.
Waterman	N. Waterman	Dewittville.
Watts Flats.....	G. H. Smith.....	Watts Flats.
West Ellery	Frank W. Stowell.....	Bemus Point.
Wrights Corners	John McAdam	Forestville.
CAYUGA COUNTY.		
Bethel Corners.....	W. H. Westover.....	Bethel Corners.
Cato	W. E. Cusack	Jordan.
Como	C. J. Robbins	Como.
Ira	E. H. Brigham.....	Ira.

Locke.....	S. S. Bemis	Locke.
North Victory	E. H. Ladd.....	North Victory.
Summer Hill.....	Chas. S. Ranney.....	Summer Hill.
Victory Association	Herbert W. French	Victory.
Chenango County.		
Cowles	Geo. D. Cowles.....	Greene.
Fly Creek	Barber & Miner.....	Oxford.
E. M. Johnson	L. A. Gross	Greene.
Lyon Brook.....	E. L. Haynes.....	Lyon Brook.
Marcy	L. A. Gross	Greene.
Maple Grove.....	James E. Lake	Pitcher.
Smithville	C. H. Southard.....	Smithville Flats.
Smyrna Hill	David Campbell	Smyrna.
Tuttle	J. L. Carver.....	Greene.
Clinton County.		
Clinton.....	A. D. Boomhower	Plattsburgh.
Cortland County.		
Bear Springs	Arthur C. Clark	Solon.
Carson	C. E. Carson	Marathon.
Cortland County Central.....	Davis & Rowe.....	McGrawville.
Homer West Hill.....	Chauncey Garner.....	Homer.
Meacham.....	J. W. Hallock.....	Marathon.
Milk Producers' Union.....	W. E. Russell.....	Blodgetts Mills.
North Solon.....	C. W. Ellis.....	McGrawville.
Sears.....	Frank H. Sears.....	Cortland.
Wightmans	Homer Wightman.....	Marathon.

DELAWARE COUNTY.

NAME OF FACTORY.	Applicant.	Post-office.
Riverside	A. G. Sargent	Sidney.

ERIE COUNTY.

Beaver Meadow	Clair Bros.	Springville.
Bigelow	Clair Bros.	Springville.
Block	Clair Bros.	Springville.
Canada	Clair Bros.	Springville.
Clear Creek	J. C. Brigham	Collins Centre.
Cloverfield No. 1	Richardson, Beebe & Co.	East Aurora.
Cloverfield No. 2	Richardson, Beebe & Co.	East Aurora.
Cloverfield No. 3	Richardson, Beebe & Co.	East Aurora.
Cloverfield No. 4	Richardson, Beebe & Co.	East Aurora.
Cloverfield No. 5	Richardson, Beebe & Co.	East Aurora.
Cloverfield No. 6	Richardson, Beebe & Co.	East Aurora.
Cloverfield No. 7	Richardson, Beebe & Co.	East Aurora.
Cloverfield No. 8	Richardson, Beebe & Co.	East Aurora.
Cloverfield No. 9	Richardson, Beebe & Co.	East Aurora.
Cloverfield No. 10	Richardson, Beebe & Co.	East Aurora.
Cloverfield No. 11	Richardson, Beebe & Co.	East Aurora.
Cloverfield No. 12	Richardson, Beebe & Co.	East Aurora.
Cloverfield No. 13	Richardson, Beebe & Co.	East Aurora.
Cloverfield No. 14	Richardson, Beebe & Co.	East Aurora.
Cloverfield No. 15	Richardson, Beebe & Co.	East Aurora.
Cloverfield No. 16	Richardson, Beebe & Co.	East Aurora.

Cloverfield No. 17.....	Richardson, Beebe & Co.....	East Aurora.
Cloverfield No. 19.....	Richardson, Beebe & Co.....	East Aurora.
Cloverfield No. 20.....	Richardson, Beebe & Co.....	East Aurora.
Cloverfield No. 21.....	Richardson, Beebe & Co.....	East Aurora.
Cloverfield No. 22.....	Richardson, Beebe & Co.....	East Aurora.
Cloverfield No. 23.....	Richardson, Beebe & Co.....	East Aurora.
Cloverfield No. 24.....	Richardson, Beebe & Co.....	East Aurora.
Cloverland.....	J. S. Simons.....	Sardinia.
Crossman.....	Clair Bros.....	Springville.
Dye.....	Clair Bros.....	Springville.
East Concord.....	Clair Bros.....	Springville.
East Holland.....	Grant Miller.....	Protection.
Ellicottville.....	Clair Bros.....	Springville.
Fox.....	Clair Bros.....	Springville.
Franktown.....	Clair Bros.....	Springville.
Frye.....	Clair Bros.....	Springville.
Glenwood.....	Clair Bros.....	Springville.
Henshaw.....	Clair Bros.....	Springville.
Pullman.....	Clair Bros.....	Springville.
Richmond.....	Clair Bros.....	Springville.
Smith.....	Clair Bros.....	Springville.
Somerville.....	Clair Bros.....	Springville.
Springville.....	Clair Bros.....	Springville.
Townsend Hill.....	Clair Bros.....	Springville.
Vance Combination.....	S. D. Vance.....	East Concord.
Vinton.....	Clair Bros.....	Springville.
West Machias.....	Clair Bros.....	Springville.
West Valley.....	Clair Bros.....	Springville.

GENESEE COUNTY.

NAME OF FACTORY.	Applicant.	Post-office.
Alexander No. 1.....	Sanford Riddle	Alexander.
Byron... ..	H. C. Norton.....	Byron.
HERKIMER COUNTY.		
Ash Creek.....	Thorne E. Curtis.....	Ohio.
Avery & Ives.....	R. H. Strough	Little Falls.
Bastow Hill.....	James W. Ford.	Fairfield.
Bethel.....	T. C. Swift.....	Jordanville.
Big Spring.....	W. McKerron.....	Middleville.
Brown Bros	Brown Bros.....	Newport.
Cedarville	D. W. Morris.....	Cedarville.
Clover Valley.....	C. A. Ford.....	Little Falls.
Cold Brook.....	Brown Bros	Newport.
Columbia Centre.	N. J. Harter	Columbia Centre.
Cook, Ives & Co.....	C. L. Ives.....	Salisbury.
Countryman.....	M. Getman.....	Mohawk.
Craines Corners.....	T. C. Swift.....	Jordanville.
Cullen.....	C. Garline.....	Cullen.
Davis, Geo. H.	Geo. H. Davis.....	Frankfort.
Denisons Corners.....	M. Getman.....	Mohawk.
East Schuyler.....	S. P. Lints, Jr.	East Schuyler.
Eggleston No. 1.....	O. E. Eggleston.....	West Winfield.
Eggleston No. 3.....	O. E. Eggleston...	West Winfield.

Eggleston No. 4.....	O. E. Eggleston.....	West Winfield.
Eggleston No. 10.....	O. E. Eggleston.....	West Winfield.
Eggleston No. 11.....	O. E. Eggleston.....	West Winfield.
Eggleston No. 13.....	O. E. Eggleston.....	West Winfield.
Fairfield Centennial.....	Alexander McKerron.....	Middleville.
Fairfield Centennial Branch.....	G. Veitch.....	Middleville.
Fairfield Dairy Association	Terence Atkins	Little Falls.
Fenner, G. W.....	Theron Kane.....	Middleville.
Fulmer Creek.....	O. B. Christman.....	Mohawk.
Getman, M.....	M. Getman	Mohawk.
Gilt Edge.....	C. W. Davis.....	Frankfort.
Gray.....	A. E. Snyder.....	Gray.
Gulph	James Donahoe.....	Gulph.
Henderson Association.....	T. C. Swift.....	Jordanville.
Herkimer.....	Peter Miller.	Herkimer.
Hickory Grove.....	W. H. Jones	Danube.
Hinckley, G.	E. H. Hughes.....	Gravesville.
Jordanville.....	M. Getman	Mohawk.
Kast Bridge.....	Alvin Countryman.....	Herkimer.
Kings, A. S.....	A. S. Kings	Norwich Corners.
Knapp, Wheeler.....	Isaac Fox.....	Dolgeville.
Lanning	W. B. Lanning.....	Russia.
La Rue, L. A.....	L. A. La Rue.....	Little Falls.
Little Falls.....	Hiram Broat.....	Little Falls.
Lyon, J. H.....	J. H. Lyon.....	Cold Brook.
Manheim	Joseph Rice.....	Little Falls.
Miles, Moore.....	Miles Moore.....	Russia.
Monitor	Charles B. Bullock.....	Gray.
New Manheim.	John Garlock.....	Little Falls.

HERKIMER COUNTY — (Concluded).

NAME OF FACTORY.	Applicant.	Post-office.
Newville Association.....	Wm. E. Strykon.....	Newville.
North Litchfield.....	H. H. Davis.....	North Litchfield.
North Winfield Combination No. 1.....	C. T. Wheelock.....	West Winfield.
North Winfield Combination No. 2.....	C. T. Wheelock.....	West Winfield.
North Winfield Combination No. 4.....	C. T. Wheelock.....	West Winfield.
North Winfield Combination No. 5.....	C. T. Wheelock.....	West Winfield.
North Winfield Combination No. 6.....	C. T. Wheelock.....	West Winfield.
O. E. Eggleston No. 2.....	O. E. Eggleston.....	West Winfield.
Old Fairfield.....	E. C. Rice.....	Fairfield.
Old Salisbury.....	Mrs E. S. Burrell.....	Salisbury.
Paine's Hollow.....	G. H. Van Slyke.....	Edicks.
Rising Star.....	John Conrad.....	Paine's Hollow.
Schuyler's Centennial.....	W. V. Minott.....	East Schuyler.
Shell's Bush.....	J. A. Krum.....	Eatonville.
Small's Bush.....	Adam Casler.....	Little Falls.
Snell's Bush.....	David Cassidy.....	East Creek.
South Columbia.....	M. Getman.....	Mohawk.
Sterling Creek.....	C. G. Babcock.....	Newport.
Waddell & Eggleston.....	O. E. Eggleston.....	West Winfield.
West Winfield.....	Christopher Vagt.....	West Winfield.
White Creek.....	John Baird.....	Newport.

JEFFERSON COUNTY.

Allen, H. J	H. J. Allen	Adams.
Ball, E	H. C. Ball	Watertown.
Banner	E. McTaggart	Henderson.
Belleville	Ingraham, Overton & Co	Belleville.
Bullock	D. B. Rogers	Worthville.
Centre.	Walter Fall	Plesis.
Champion Village	Asa Loomis	Champion.
Chaumont Cheddar Cheese	Copley Bros.	Chaumont.
Collins Landing	Walter Collins	Omar.
Cold Brook	L. E. Walts	Omar.
Cooper, I. C.	I. C. Cooper	Theresa.
Cooper, I. C.	I. C. Cooper	Theresa.
Douglass	John P. Douglass	Theresa.
Drill Well	C. W. Cheney	Sterlingville.
Eames	H. C. Eames	East Watertown.
Empire State	R. P. Grant	Clayton.
Excelsior	Edward Spicer	Perch River.
Fillmore Bros.	H. H. Fillmore	Woodville.
Flat Rock	G. W. Augsburg	Plesis.
Fox, G. A.	M. H. Fox	Lorraine.
Gould	Gould & Bacon	Pamelia Four Corn'rs
Grindstone Island	W. H. Rees	Clayton.
Hadsall & Moore	A. W. Hadsall	Black River.
Henderson	E. Fales	Henderson.
Hill Spring	C. H. Grapatte	Omar.
Hillside	C. O'Brien	Theresa.
Jefferson Valley	W. & I. Schell	Evans Mills.

JEFFERSON COUNTY — (Concluded).

NAME OF FACTORY.	Applicant.	Post-office.
Kings.....	Frank King.....	Ellisburgh.
Line Road.....	R. P. Grant.....	Clayton.
Lorraine Village.....	W. R. Gow & Co.....	Lorraine.
Maple Grove.....	Adelbert M. Brown.....	Lorraine.
Mather Bros.....	Simeon Mather.....	Belleville.
McNett.....	McNett Bros.....	Champion.
Muzzy.....	F. M. & J. B. Muzzy.....	Smithville.
North Adams.....	E. D. Holloway.....	Adams Centre.
North Rodman.....	J. Sterling Sill.....	Rodman.
O. K.....	F. A. Knapp.....	Great Bend.
Orleans Valley.....	R. P. Grant.....	Clayton.
Pamelia.....	E. B. Nichols.....	Watertown.
Pamelia Centre.....	W. A. Ebbbie.....	Watertown.
Perry's.....	Levi S. Perry.....	Limerick.
Philadelphia.....	Wm. Flath.....	Philadelphia.
Pitkin.....	L. S. Pitkin.....	Lorraine.
Rodman Village.....	M. G. Wilson.....	Rodman.
Shakersville.....	A. D. Boyd.....	Tremain's Corners.
Smith, A. J., No. 1.....	A. J. Smith.....	Mannsville.
Smith, A. J., No. 2.....	A. J. Smith.....	Mannsville.
South Champion.....	D. A. Goodrich.....	South Champion.
Smithville.....	D. B. York.....	Smithville.
Smith, B. J. & Son.....	C. P. Clark.....	Black River.
Smithville.....	D. B. York.....	Smithville.

Spring.....	George Flath, Jr.....	Philadelphia.
Spring Brook.....	Charles D. Chase.....	Natural Bridge.
Still.....	I. C. Cooper.....	Theresa.
Stone, E. L., No. 1.....	E. L. Stone.....	Mannsville.
Stone, E. L., No. 2.....	E. L. Stone.....	Mannsville.
Stone, E. L., No. 4.....	E. L. Stone.....	Mannsville.
Wardwell.....	I. M. Matteson.....	Pierpont Manor.
Warren Settlement.....	Louis Cornair.....	Rosiere.
Watertown Valley.....	George Butts.....	Burr's Mills.
West Adams.....	Warren Walsworth.....	Sackett's Harbor.
West Fowler.....	Bradford Sterling.....	Antwerp.
West Rodman.....	A. Harrison Heath.....	Adams Centre.
Williams, E. J., No. 2.....	J. L. Williams.....	Rutland.
Woodville.....	G. M. Wood.....	Woodville.

Lewis County.

Alger, G. S.....	G. S. Alger.....	Martinsburgh.
Alpine.....	S. J. Hiltbrand.....	High Market.
Beach Hill.....	Joseph Merz.....	New Bremen.
Boston Brand.....	S. D. Cooper.....	Lanesburgh.
Brookside.....	W. H. Wheeler.....	Billwood.
Champion Spring.....	Christian Hirschey.....	Beaver Falls.
Clover Valley.....	W. S. Benton.....	New Bremen.
Copenhagen.....	Frank J. Stockwell.....	Copenhagen.
Cold Spring.....	Chandler Merz.....	Croghan.
Collinsville.....	James Roberts.....	Collinsville.
Croniser, Chas.....	Chas. Croniser.....	Osceola.
Dairy Hill.....	David Miller.....	Constableville.
Denmark.....	A. & H. E. Cook.....	Denmark.

LEWIS COUNTY — (Concluded).

NAME OF FACTORY.	Applicant.	Post-office.
Eagle	E. G. Graves	Lowville.
Farmers' Choice	W. S. Benton	New Bremen.
Fish Creek	Henry G. Deis	Constableville.
Gardner's Corners	C. F. Niebergall	Gardner's Corners.
Gilt Edge	Milton Fassett	W. Martinsburgh.
Glendale	Rudolph Regez	Glendale.
Grass Valley	Wm. D. Lewis	Turin.
Haller	W. A. Haller	Beaver Falls.
High Mark	Wm. H. Fitch	Lowville.
Hill Side	W. S. Benton	New Bremen.
Houseville	J. H. Smith	Houseville.
Jenny Creek	David Scanlon	Harrisville.
Katsmayer	Andrew Katsmayer	West Leyden.
Katsmayer Branch	Andrew Katsmayer	West Leyden.
Legal Tender	James E. McGrath	Turin.
Lowville	Jesse F. Bowen	Lowville.
Maple Ridge	Michael J. McGrath	Martinsburgh.
McNett	McNett Bros	Champion.
Mohawk Hill	M. B. Farrell	Constableville.
New Boston	Thos. W. McGrath	New Boston.
New Model	Lewis J. Raynor	Copenhagen.
Pinckney Corners	W. T. Finn	Pinckney Cors.
Plummer	George Plummer	Constableville.
Rector	Morgan Smith	Rector.

Regetz, John.....	John Regetz.....	Constableville.
Rising Star.....	Clinton A. Fox.....	Copenhagen.
Riverdale.....	A. W. Van Arnum.....	Greig.
River Street.....	Mrs. Hattie Knowlton.....	Copenhagen.
Roaring Brook.....	Robert Wittner.....	E. Martinsburgh.
Rawson Spring.....	C. M. Henry.....	W. Martinsburgh.
Sharp.....	Wm. C. Spencer.....	Lowville.
Silver Springs.....	Morgan E. Petrie.....	Copenhagen.
Sins & Bierlie.....	Joseph Sins.....	West Leyden.
Smith, B. P. & Son.....	C. P. Clark.....	Black River.
South Harrisburgh.....	C. C. Day.....	Windecker.
Spring Brook.....	M. L. Hoffman.....	Greig.
Star.....	John C. Haller.....	Harrisburgh.
Sulphur Springs.....	Jay Searl.....	Lowville.
Swiss Creek.....	Otis A. Loomis.....	Naumburg.
Turin.....	Henry Petrie.....	Turin.
Union.....	John C. Hardy.....	Barnes' Corners.
Union.....	D. E. Kent.....	Watson.
Union Spring.....	G. E. Roberts.....	Castorland.
Valley Spring.....	B. M. Graves.....	Lowville.
West Leyden.....	Michael Earnst.....	West Leyden.
West Martinsburgh.....	T. C. Gowdy.....	W. Martinsburgh.
Wicks Bros.....	Chas. W. Shaffer.....	Diana.
Williams, C. H.....	John Phillips.....	Pinckney.
Williams, E. J., No. 1.....	John H. Fox.....	Copenhagen.
Williams, E. J., No. 3.....	E. J. Williams.....	Barnes' Corners.
LIVINGSTON COUNTY.		
Keshequa.....	Mrs. Sarah Wheeler.....	Dalton.

MADISON COUNTY.

NAME OF FACTORY.	Applicant.	Post-office.
Baldwin.....	J. L. Samson.....	Brookfield.
Beaver Creek	William W. Clark	Brookfield.
Bridgeport.....	John Durst	Bridgeport.
Cold Spring.....	Charles E. Lovejoy	Madison.
Cole	W. G. Hatch	Lebanon.
Crystal Springs	O. J. Tucker	Mile Strip.
East Boston.....	A. W. Prescott	East Boston.
Excelsior	U. N. Holmes	Brookfield.
Excelsior	Mrs. S. R. Hill	Chittenango.
Harris, E.....	Edgar Harris.....	Brookfield.
Hollenbeck.....	R. J. Hollenbeck.....	Peterboro.
Hubbardsville	F. Blanding	Hubbardsville.
Ladd, Dan	Dan Ladd.....	Canastota.
Lake View	H. M. Stafford	Perryville.
Lenox Mills.....	Buyea & Miller.....	Hobokenville.
Marsh.....	C. O. York.....	Brookfield.
Mott.....	G. M. Rainey	Leonardsville.
Oneida Valley.....	Edgar Hills	Oneida Valley.
Osgood.....	G. N. Stone.....	Chittenango.
Peterboro	W. E. Davis.....	Peterboro.
Pleasant Valley	Levi Miller, Jr.....	Peterboro.
Reservoir	S. D. Burdick.....	De Peyster.
Sheds Corners.....	Alexander Harris.....	Sheds Corners.
Solsville	A. N. Peckham	Solsville.

Stockbridge.....	J. D. Clemens.....	Stockbridge.
Stockbridge Star.....	L. C. Hinman.....	Valley Mills.
Temple.....	I. A. Wager	N. Brookfield.
Union.....	Milton H. Morgan.....	Brookfield.
Valley Mills.....	Clinton Adams.....	Valley Mills.

MONTGOMERY COUNTY.

Bowman's Creek	Peter McEwan.....	Marshville.
Christman, G. H.	G. H. Christman.....	St. Johnsville.
Dockstader	Wm. Dockstader.....	Palatine Bridge.
Fairview.....	J. S. Devendorff	St. Johnsville.
Minaville	Hiram Schuyler	Minaville.
Mohawk.....	Daniel Dockstader	Fonda.
Mother Creek	Harvey Fox.....	St. Johnsville.
Sand Hill.....	Theron Bellingher	Fort Plain.
Smith, A. & Co.....	Fayette B. Smith	St. Johnsville.
Waterville	D. R. Mallette.....	Ames.

NEW YORK COUNTY.

Bemus Point.....	Wm. E. Smith & Co.....	New York City.
Centralia	Wm. E. Smith & Co.....	New York City.
Canadua	Wm. E. Smith & Co.....	New York City.
Cold Spring.....	Wm. E. Smith & Co.....	New York City.
Columbia	Wm. E. Smith & Co.....	New York City.
Red Bird	Wm. E. Smith & Co.....	New York City.
Roods	Wm. E. Smith & Co.....	New York City.
Sample Hill.....	Wm. E. Smith & Co.....	New York City.
Sinclairville.....	Wm. E. Smith & Co.....	New York City.

ONEIDA COUNTY.

NAME OF FACTORY.	Applicant.	Post-office.
Alexis.....	David E. Karlen.....	Boonville.
Augusta.....	John W. Skerritt ..	Augusta.
Augusta Valley ..	John W. Skerritt ..	Augusta.
Baker	Fred P. Baker.....	Camden.
Bartlett	D. Matti.....	Bartlett.
Bennett's Corners.....	Mrs. M. I. La Munion	Kenwood.
Blossvale	John Halstead.....	Blossvale.
Blue Brook	Roscoe C. Coon	Ava.
Brodock	Andreas Brodock	Plains.
Castle, G	Henry C. Morehouse ..	Ava.
Central	Marion Hull.....	Wilna.
Chard	Robert Chard	Washington Mills.
Chrestien, A	James Kirkland	Florence.
Chrestien, F. N.....	F. N. Chrestien.....	Camden.
Cloverdale	James D. Kelly.....	Deansville.
Cold Spring.....	Richard J. Williams	Remsen.
Conway	W. M. & S. J. Conway.....	Remsen.
Cornish	A. Cornish	Camden.
Cream	J. F. Burleigh.....	Vernon.
Delta	J. Macomber	Delta.
Donser	J. J. Donser.....	Boonville.
Doxtater	Daniel Wolfe.....	Higginsville.
Farmers	E. D. Franklin	Lelia.

F. F	S. H. Austin	Northwestern.
Fitch & Bacon	Hiram H. Bacon	Verona.
Floyd's Corners	E. E. McFarland	Floyd's Corners.
French Road	H. J. Fitch	East Steuben.
Greggains Wm	William Greggains	Glenmore.
Grant	Field & Start	Utica.
Hatches Corners	Charles L. Clemons	Greenway.
Hecla	T. J. Olney	Hecla Works.
Hennessy, John F	John F. Hennessy	East Florence.
Hillsboro	Ford & Wilson	Camden.
Hurlbut	James W. Harris	Ava.
Jackson	Leonard R. Reed	Boonville.
Jackson Valley	Geo. P. Mellon	Boonville.
Kelley Tract	Stephen S. Stuber	Holland Patent.
Kellogg	E. H. Kingsbury	Sangerfield.
Kent, B. H	B. H. Kent	East Steuben.
Lee Centre	H. M. Parker	Lee Centre.
Lowell	Brill & Hunter	Lowell.
Maple Grove	Blue Bros.	North Gage.
Marcy Centre	George R. Wright	Marcy.
Matti	Gottlieb Matti	Dix.
McFarland, E. E., Branch	E. E. McFarland	Floyd's Corners.
McFarland, E. E., Branch No. 2	E. E. McFarland	Floyd's Corners.
Meadow Brook	Uriah Fitch	Boonville.
Merry, F. J	Fred. J. Merry	Verona Station.
Merry, G	G. Merry	Verona.
Miller Branch	John Miller	East Florence.
Mitchell Union	Seward S. Mowers	Remsen.
Moose Creek	Warren J. Mellow	Boonville.

ONEIDA COUNTY — (Concluded).

NAME OF FACTORY.	Applicant.	Post-office.
Mowers	Seymour Mowers.....	Glenmore.
Mud Lake	J. J. Donser.....	Boonville.
Mullin Hill	Robert Roberts.....	Delta.
Newell, L. E	L. E. Newell	Colemans.
New London.....	J. J. Senn.....	New London.
North Bay.....	Nicholas Van Horne	North Bay.
North Steuben	N. H. Folts	North Western.
North Trenton	R. E. Jones	Remsen.
O. K.....	Edwin C. Williams.....	Deerfield Corners.
Point Rock	C. H. Waters.....	Point Rock.
Porter	C. W. Porter.....	North Western.
Rathbuns.....	Charles Rathbun.....	Verona Mills.
Red Brook	Henry E. Blanchard	Vernon.
Remsen	T. J. Williams.....	Remsen.
Ridge	Robert McAdam.....	Rome.
River Road.....	George G. Prescott	Maynard.
Rock Maple Grove	J. H. Wollaber	North Steuben.
Saulpaugh	C. H. Saulpaugh.....	Rome.
Southwestern	C. D. Parsell.....	Big Brook.
Star Hill	Everett C. Judson	Remsen.
Steuben Association	J. D. Merrick	Steuben.
Steuben Centre.....	H. A. Johnson.....	Steuben.
Storey.....	Storey Bros.....	Westmoreland.
Sulphur Springs.....	Thomas Squires.....	Stokes.

Taberg	Geo. J. Haas	Taberg.
Teal	A. B. Teal	Westmoreland.
Thomas, G. D.	G. D. Thomas	Camroden.
Thomas, R. E.	Daniel Jones	Alden Creek.
Trenton	William H. Comstock	Utica.
Tripp, M. G.	M. G. Tripp	Paris Station.
Union	Godfrey Teuscher	Oriskany.
Verona Landing	Mrs. T. Breckenridge	Higginsville.
Vernon & Verona	S. J. Burleigh	Vernon.
Vienna	Irving Blasier	Vienna.
∞ Walesville	Thomas Prescott	Walesville.
Walsworth	Gardner Haynes	Delta.
Waterbury	Harry W. Boles	Florence.
West Branch	David Kerlen	West Branch.
West Camden	E. R. Sly	West Camden.
West Vienna	J. H. Meays	Vienna.
Willow Grove	Frank Broadbent	Trenton.
Willow Valley	P. C. Mills	Alden Creek.

ONONDAGA COUNTY.

Brewerton	H. S. Casler	Brewerton.
Clay Centre	Frank M. Burlis	Euclid.
Delphi	M. S. Allen	Delphi.
East Fabius	M. S. Allen	Fabius.
Keeney Settlement	M. S. Allen	Delphi.
Loomis, A. J.	A. J. Loomis	Cicero.
North Manlius	W. M. Jones	North Manlius.
Pompey Block	Newman & Hackett	Fabius.
Pompey Centre	Moore, Southard & Co	Pompey Centre.

ONONDAGA COUNTY — (Concluded).

NAME OF FACTORY.	Applicant.	Post-office.
Pompey Hollow	Charles Hunt	Delphi.
Pompey Star	O. L. Robinson	Fabius.
OSWEGO COUNTY.		
Albion Centre	Henry Throp	Sand Bank.
Amboy Centre	Robert Foils	Amboy.Centre.
Battle Island	Charles L. Porter	Fulton.
Castor	George L. Castor	Pulaski.
Central Square	H. E. Beeby	Central Square.
Colosse Union	Edgar Hamilton	Mexico.
Davis	H. L. Davis	Kasoag.
Demster	Willard E. Gilson	Demster.
Druse Brothers	George D. DeWolf	North Volney.
Dugway	J. Doney	Dugway.
Eagle	A. H. Snell	Mexico.
East Scriba	H. E. Middleton	Scriba
Finster, I. E	I. E. Finster	Lacona.
Gilbert's Mills	C. H. Burlis	Gilbert's Mills.
Hannibal	E. B. Tucker	Hannibal.
Hess	Philip Hess	West Amboy.
Hilton	Fred Hilton	Orwell.
Ingersoll	E. M. Ingersoll	Lacona.
Johnson, G. Y	Greene Johnson	Williamstown.
Le Clair	F. P. Le Clair	Lacona.

Little Valley.....	M. A. Jayner.....	Greenboro.
May Flower	Horatio Potter	West Monroe.
May Flower	Andrew Ott.....	Redfield.
McKinney, A. C.....	A. C. McKinney.....	Orwell.
Mill Brook	Ardie S. Hinckley	North Hannibal.
Molino	Don E. Fairchild.....	Orwell.
Mowry	E. E. Mowry	Daysville.
Mowry No. 2	E. E. Mowry	Daysville.
New Haven	R. H. Baker.....	Mexico.
North Constantia.....	Daniel H. Tuttle.....	North Constantia.
North Road.....	F. H. Backus.....	Scriba.
North Scriba	C. A. Donnelly	North Scriba.
Olmstead, A. E.....	A. E. Olmstead.....	Orwell.
Oneida River	F. M. Metcalf	Rawson.
Parish Centre.....	R. H. Stevenson	Parish.
Parish Cheese and Butter Company	W. H. Baker	Parish.
Peats Corners.....	D. G. Clark	East Palermo.
Pennellville.....	C. F. Barnaskey	Pennellville.
Phoenix No. 1	Albert P. Merriam.....	Phoenix.
Phoenix No. 2	Wm. H. Keeler.....	Hinmansville.
Pulaski.....	W. C. Holmes	Pulaski.
Ricard	D. E. West.....	Ricard.
Salisbury	Brayton Salisbury	Pulaski.
Star	Joseph Fox	Redfield.
Stevens, Allen M.	Allen M. Stevens.....	Orwell.
Stillwater	G. D. Hunt.....	Orwell.
Stone Quarry.....	John Pifer.....	Arthur.
Volney Centre.....	G. D. Trimble	Palermo.
West Monroe Star.....	Will Mutter.....	West Monroe.

OSWEGO COUNTY — (Concluded).

NAME OF FACTORY.	Applicant.	Post-office.
Wilcox's.....	Milo Wilcox.....	Oswego Falls.
Willow Brook.....	S. J. Hadley.....	Sandy Creek.
OTSEGO COUNTY.		
M. D. Casler Extra Quality	M. D. Casler.....	Garrattsville.
Dimick Hollow.....	Gilbert & Root.....	Gilbertsville.
German	August Aufmuth.....	Flv Creek.
Gilbertsville	Gilbert & Root.....	Gilbertsville.
Gregory, S. C.....	Gilbert & Root.....	Gilbertsville.
Hartwick Seminary	Gilbert & Root.....	Gilbertsville.
Hinman Hollow	Gilbert & Root.....	Gilbertsville.
Home Made.....	Gilbert & Root.....	Gilbertsville.
Kinney, J. P.....	J. P. Kinney.....	Snowden.
Lambs, E. D.....	E. D. Lambs.....	Unadilla Forks.
Laurens	Gilbert & Root.....	Gilbertsville.
Lloydsville	K. J. Wing.....	Unadilla Forks.
May Flower.....	H. C. Brockway.....	Richfield.
Milford Centre.....	L. W. Segar.....	Portlandville.
New Lisbon.....	Gilbert & Root.....	Gilbertsville.
Nichols, A. M.....	A. M. Nichols.....	W. Edmeston.
Parks	George M. Ackerman.....	Burlington.
Patten.....	Fred B. Rainey.....	Burlington.
Pittsfield	Gilbert & Root.....	Gilbertsville.
Roots	Gilbert & Root.....	Gilbertsville.

Schuyler Lake.....	Mrs. C. M. Baker.....	Schuyler's Lake.
South Hartwick.....	Gilbert & Root.....	Gilbertsville.
Spoenburgh, W. H.....	W. H. Sponenburgh.....	Fly Creek.
Stanley	Jeremiah Fogarty.....	Middlefield Center.
Westford	C. E. McRosie.....	Westford.
West Oneonta.....	C. P. Root.....	Gilbertsville.
Wileytown	L. P. Young.....	Oaksville.
Young, Fred. L.....	Fred. L. Young.....	Oaksville.

ST. LAWRENCE COUNTY.

Centennial.	Samuel Erwin.....	Lisbon.
Cheshire.....	Fred. W. Green.....	De Kalb Junction.
Cow Path	McGee Johnson	De Kalb Junction.
East Pierrepont	F. P. McCarthy.....	Hanawa Falls.
Hodgkin.....	Hodgkin & Berry.....	Spragueville.
Maple Grove.....	Chas. A. Moore.....	Potsdam.
N. Y. S. No. 33.....	Dalton Bros.....	Gouverneur.
Rensselaer Falls.....	H. L. Grant.....	Rensselaer Falls.
Settlement.....	W. E. Brainard.....	Canton.
Somerville	James W. Marshall.....	Somerville.
Sprague	F. W. Sprague.....	Hailesboro.
Thousand Island	Daniel F. Babcock.....	Chippewa Bay.
White Clover	Herbert Ames.....	Fine.
1000 Island ...	R. P. Grant.....	Clayton.

SCHENECTADY COUNTY.

Princeton Dairy Association	S. W. Quick.....	Rynex's Corners.
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STEUBEN COUNTY.

NAME OF FACTORY.	Applicant.	Post-office.
Barney & Updyke.....	Wm. Wahl.....	West Union.
Bennett's Creek	W. C. Bassett.....	Bennett's Creek.
Call Hill.....	D. A. Oakes.....	Purdy Creek.
Doublin	J. W. Bennett.....	Howard.
Drake	O. D. Stephens.....	Greenwood.
Greenwood	Geo. M. Stephens.....	Greenwood.
Greenwood Village.....	O. D. Stephens.....	Greenwood.
Neil's Creek.....	I. F. Barens.....	Neil's Creek.
O'Dells.....	R. H. O'Dell.....	Jasper.
Snyder Combination No. 3.....	O. H. Snyder.....	North Fork, Pa.
Snyder Combination No. 9.....	O. H. Snyder.....	North Fork, Pa.
Snyder Combination No. 10.....	O. H. Snyder.....	North Fork, Pa.
Troupsburgh Village.....	James McKinley.....	Troupsburgh.
Wileysville	Egbert Cornell	Wileysville.
TOMPKINS COUNTY.		
Lafayette.....	John H. Kilbourne.....	McLean.
McLean.....	Frank E. Perry.....	McLean.
WASHINGTON COUNTY.		
Salem	James M. Thompson	Salem.

WAYNE COUNTY.	
Red Creek.....	A. E. Ford.....| Red Creek.
WYOMING COUNTY.	
Bliss	John O. Mills
Castile	Charles H. Hess
East Koy	C. H. Bevier
Empire	A. M. Thomson,.....
Excelsior No. 1.....	Winchester & Morton.....
Excelsior No. 2.....	Winchester & Morton.....
Excelsior No. 3.....	Winchester & Morton.....
Excelsior No. 4.....	Winchester & Morton.....
Excelsior No. 5.....	Winchester & Morton
Excelsior No. 6.....	Winchester & Morton.....
Excelsior No. 7.....	Winchester & Morton.....
Excelsior No. 8.....	Winchester & Morton.....
Excelsior No. 9.....	Winchester & Morton.....
Excelsior No. 10.....	Winchester & Morton.....
Excelsior No. 11.....	Winchester & Morton.....
Excelsior No. 12.....	Winchester & Morton.....
Excelsior No. 13.....	Winchester & Morton.....
Greene, C. A.....	C. A. Greene.....
Griffiths	Orlando Craft
Hermitage.....	Peter P. Glor.....
Oatka	James Parker
Silver Springs.....	N. Lamberson
South Eagle	A. B. Wright.....
Star No. 1.....	T. J. Hubbard.....
	Bliss.
	Castile.
	East Koy.
	Lamont.
	Attica.
	Attica.
	Attica.
	Attica.
	Attica.
	Attica.
	Attica.
	Attica.
	Attica.
	Attica.
	Attica.
	Attica.
	Warsaw.
	Lamont.
	Hermitage.
	Rock Glen.
	Silver Springs.
	Pike.
	Wethersfield.

WYOMING COUNTY — (Concluded).

NAME OF FACTORY.	Applicant.	Post-office.
Star No. 2.....	T. J. Hubbard.....	Wethersfield.
Star No. 3.....	T. J. Hubbard	Wethersfield. .
Star No. 4.....	T. J. Hubbard.....	Wethersfield.
Stearns.....	W. E. Stearns	Arcade.

I am informed by persons in the cheese business that the use of this brand upon the cheese of this State has come to be regarded as a guarantee as to the quality, and that cheese upon which it appears bring a better price than those which do not bear it.

It has been one of the aims of the department to so control and regulate the use and care of these brands as to make it practically impossible for them to be used upon any other cheese than those manufactured at the particular factory to which the brand is issued. It will take but a moment's reflection to see that thus confining the use and care of the brand is one of the safeguards necessary to maintain the value of the brand as such; each factory thereby making its own reputation under the number issued to it can stand or fall upon its own merits without having to divide with some other factory which might under other conditions secure the use of the same number after that reputation had been acquired. To this end those using the brands can aid this department greatly by observing strictly the requirements and regulations under which the brands are issued; it is a matter requiring but a little care and strictness and in which considerable is involved. It is respectfully suggested to those concerned that care should be given to the brand or trade-mark that gives such enlarged confidence in the product as to bring an increased price. I do not see why men should not care for this as zealously as they would for other matters affecting their finances.

CHEESE INSTRUCTION.

The Legislature of 1888 provided for instruction in the art of making butter and cheese, providing that it should be done under the supervision of the Dairy Commission. The act making such provision was designated as chapter 298 of the Laws of 1888, of which the following is a copy:

Section 1. The New York State Dairy Commissioner is authorized and directed to appoint and employ expert butter and cheese makers, not exceeding five in number, whose duty it shall be, under his directions, to examine and inspect butter and cheese factories and the methods employed therein, and attend at such agricultural fairs, institutes, meetings and conventions within the State, as shall be designated by the Commissioner, to impart thereat infor-

mation as to the best and most approved methods of making butter and cheese and improving the quality thereof. The compensation of such experts shall be fixed by the Commissioner and their necessary expenses incurred in the performance of their duties audited by him; and the same shall be paid by the Treasurer of the State upon the warrant of the Comptroller thereafter. The sum of five thousand dollars is hereby appropriated for such purpose to be paid out of any moneys in the treasury not otherwise appropriated; and the entire expenses of the Commissioner under this act shall not exceed such sum. The Commissioner on or before the fifteenth day of December of this year shall report the number of experts employed under this act and their compensation and expenses, which shall be included in his annual report.

§ 2. This act shall take effect immediately.

In studying and investigating this subject preparatory to the beginning of the work, I ascertained that such instruction had been going on for some little time in Canada, and that the result was that they were producing a more nearly uniform high grade cheese than ever before, and that their cheese were bringing from one to two cents more than it did prior to the commencement of this work.

An expert cheesemaker from this State examined cheese in storage made there under their new instruction and pronounced it as uniform as though made in one manufactory, while as a matter of fact it was made in forty different factories. It was not only uniform but was of a high grade.

To produce a result such as this in all the cheese factories in this State was a task before this department in addition to its other work. With this end in view its first object was to obtain cheese instructors. The requirements as to them was that they should not only be men who could make the required product under favorable conditions but that they could under unfavorable conditions produce a product approximating it, and in addition to this that they should be able to impart to others sufficient knowledge by practical instruction and otherwise so as to enable them to afterward do the same. After some time I succeeded in getting three men who, after comparing notes and experimenting, recommended a plan of action which was decided upon. It was quite apparent that these three men could not in one

or two years visit all the cheese factories in this State, spending only one day at each factory, as there are in the State nearly 1,500. It was not, of course, to be assumed that all the cheese factories were in a condition to need their help, neither was it safe to assume that any considerable percentage would not need their help. After formulating the plan of instruction and deciding on what lines information should be imparted I caused a circular to be issued setting forth at length the instruction that it was proposed to give. A large number of these were printed and circulated among the dairymen and cheese and butter makers of the State. It was entitled "Rules and Suggestions Concerning the Care of Milk and the Making of First Class Butter and Cheese." It was apparent to me that in order produce a good, uniform cheese from the milk brought to the factory that it (the milk) should be in the best possible condition at the time of delivery. To this end it was necessary that those producing milk should have instruction as to the best methods of caring for it; not only that but as to the care and feeding of the animals which produced it, so that the first thing discussed in the pamphlet was the production and care of the milk. The following is a copy:

Rules and Suggestions.

I am so thoroughly impressed with the importance of the farmer becoming better educated in the care of his milk that I would feel that my duty was but poorly done if his attention was not called to certain conditions necessary to insure a good product. I am well satisfied that the future success of the cheese industry in this State depends largely upon the manner in which milk is cared for before taking it to the factory. Everything about the stable must be clean and neat, and the place where the milk can is kept must have a good, free circulation of pure air, away from the odors of the barn-yard and stable. Some device should be used by which the milk can be thoroughly exposed to the air as soon as drawn from the cow, so as to rid it of the animal odors and gases while it is warm, as they become condensed by cooling of the milk and cannot be removed by subsequent aeration. The old time theory, that the heat in the milk is what causes all the trouble, is, I am satisfied, entirely wrong, as the heat in milk, when drawn from the cow, is no different from any other heat, and has nothing to do with the animal odors. This is easily

proven by cooling a can of milk quickly, when you will find, no matter how cold it is, that the animal flavor is still there. On the other hand, take a can of warm milk just drawn from the cow, and pass it through an elevated strainer by which it is thoroughly aerated, and you will find the odor gone while the milk is yet warm. To secure the best results in cheese-making, the milk should not be cooled below the temperature of the air, during the summer months, in order to secure the proper ripeness so that the acid development will keep ahead of any possible taints. The night's and morning's milk should never be mixed before arriving at the factory, as the night's milk, standing until morning, becomes loaded with the bacteria that are constantly in the air, especially in warm weather, and when you add the warm milk it raises the temperature of the whole mass, and they begin their work at once, so that by the time the milk reaches the factory, it will, quite likely, be in bad condition. The idea, that by hauling milk to the factory twice a day, without aerating it, removes all responsibility from the patron, is an error. It will retain all the gas and odor, and, being covered tightly, they will become condensed in the milk, where it is drawn any distance, and it will be injured before it comes under the maker's control. Too much care cannot be taken in the cleansing and scalding of everything connected with dairy, cans, pails, strainers, etc. Remember that it must be scalding water; warm water will not accomplish the purpose. Never allow the cows to be chased by the dog. Any thing that produces a feverish condition of the cow will result in injury to the milk. The farmer has so many cares besides that of giving proper attention to his milk that it is often sent to the factory in bad condition without his knowledge. He should, however, give this matter his personal attention, because the income of others, as well as his own, will be reduced by allowing his milk to go to the factory in bad condition. The food the cow eats and the water she drinks has a direct influence on the quality of her milk. The water must be pure; it is important that she be kept away from stagnant pools. They should also have plenty of salt; much discussion has been had and many experiments have been made with a view of ascertaining the amount of salt milk cows should have. It has come to be well established that the best method of furnishing salt to cows is in some way to place it within their reach so they can help themselves every day.

In the making of cheese under the co-operative plan, as practiced in the factories at the present time, it is necessary for the cheesemaker to be a man of excellent judgment, for, with the constantly varying conditions of atmosphere and the different ways in which the milk is cared for by the individual farmer, a small error

in judgment is liable to injure the whole product. When the milk is received at the factory in the morning his sense of smell must be keen to detect the bad odors and to determine whether the milk is sufficiently ripened to have the acid development keep pace with the rennet action. This degree of ripeness is difficult to determine, as the degree of acidity must not reach the point where the milk would be termed sour. We have but one test at the present time beside the sense of smelling for determining the amount of acidity in the milk. It is termed the cup test: It consists in taking a small measure of milk from the vat and adding a little rennet, then noting the time which it takes for coagulation to begin. It is founded on the well-known fact that with the development of acidity in the milk the activity of the rennet is increased.

It is not easy to make this test thoroughly practical on account of the difficulty of measuring so small an amount of rennet; also of having a uniform strength at all times. Hence the importance of having the sense of smell thoroughly trained to detect the least change. There are two ways practiced at the present time for securing this ripeness when it is determined that the vat of milk is too sweet. One is by keeping over a small amount of milk that is free from taint, and souring it, and then putting it in the vat of milk at the time the rennet is added. This plan is very good if the maker is careful not to use too large a quantity and sees to it that the earthen jar, which is used for keeping the milk over, is thoroughly washed and scalded every day so as not to accumulate and carry along taints. Undoubtedly the safer plan is to heat the milk up to a temperature of eighty-six to eighty-eight degrees and hold it there for one or two hours, or until the proper acidity is developed, and then let the temperature settle back to the setting point. This is a more natural process, and will, I think, generally give better results, although taking a little more time. In heating the milk great care should be observed to keep it thoroughly agitated, not allowing it to rest on the bottom of the vat for any length of time; and the steam should be shut off quick enough so that the heat will not run too high when the surplus heat in the water surrounding the tin vat is thoroughly equalized through the whole mass.

The great necessity for this is that the curd shall come all alike, and not be harder on the bottom from an excess of heat. The best temperature for setting, that is, introducing the rennet, is eighty-two to eighty-four degrees in the summer and eighty-six degrees in the spring and fall. Use sufficient rennet to have coagulation begin in from eighteen to twenty minutes. The top of the milk should be kept gently agitated, to keep down the cream, but care must be

exercised not to stir too long, or until the milk begins to thicken. This point can best be determined by taking a dipper of hot water and floating it in the vat of milk. When coagulation begins it will show a film on the outside of the dipper induced by the higher temperature, which causes earlier thickening. As soon as this point is reached, the vat should be covered and kept perfectly still until fit to cut. In cutting, do not allow the curd to become too hard before introducing the knife. A good test for the proper time to cut is by laying the back of the fingers and hand on the curd next to the side of the vat and gently bearing it away. When it will cleave clean from the vat it is fit to cut. When the cutting is commenced finish before stopping. There is nothing to be gained by the old plan of allowing the curd to stand and settle after cutting once through, but, on the other hand, a positive loss, as the curd becomes tough, and will push before the knife, breaking off small particles which are lost. Use every care to have the pieces of curd even, so that the heat and rennet will act together and on all alike, producing an even curd, without which it is impossible to make a fine cheese. As soon as the cutting is completed commence to stir gently and continue until the curd is healed over, which usually takes about fifteen minutes, before applying the steam. The skin or film that forms on the outside of each kernel of curd acts as a strainer, retaining the butter fats, but allowing the moisture to pass out. Hence the necessity of careful handling, not to mangle the curd and waste the fats, and of slow heating, until a temperature of ninety degrees is reached, which should take at least forty minutes so as not to shrink the film too quickly and thus destroy its porosity, thereby forming a sack of each kernel of curd, from which the moisture cannot escape, except as the piece of curd is broken, when the butter fat will pass out with it.

After reaching a temperature of ninety degrees the heat may be increased with more rapidity up to ninety-eight degrees, which is the point at which the rennet has the greatest activity and beyond which the temperature should never be raised if it can be avoided, for it tends to diminish the butter fats as butter begins to melt at ninety-eight degrees, and when the temperature is carried beyond that point, so that the fat is melted in the curd, there cannot help but be some loss. After shutting off the steam, the curd should be kept stirred until it reaches that stage of contraction at which it will not pack, and the heat is thoroughly absorbed from the water surrounding the tin vat, and then not allowed to rest a great length of time, but stirred up at short intervals so as to have the curd all even and alike. There should always be a cover to spread over the vat during this time to retain uniformity of temperature through the whole mass. The curd should be closely watched from this time on, and until the beginning of the development of acid, which

should be in from two to two and a half hours. If at this point there is not a sufficient separation of moisture from the curd, the whey should be drawn down, leaving just sufficient to float the curd, and then hand-stir until the curd becomes firm and has a shotty appearance; or, when taken in the hand and squeezed for a short time, then, opening the hand, the curd will fall apart assuming its original shape. It is very important at this time that there should be just the right amount of moisture separated from the curd. If too much moisture is driven out, there will be a loss in yield and a coarse, hard-textured cheese. On the other hand, too much moisture makes a cheese that cures too fast and will get off flavor quickly, for the reason that the retaining of so much moisture carries with it the conditions that are the most favorable to the development of the bacteria of putrefaction. Up to the time of drawing the whey, the plan of handling the curd will be about the same whether you make a stirred-curd or, what is termed sink cheese, or follow the Cheddar plan which has been adopted by this department. Not that good cheese cannot be made in the other way where all the conditions are favorable, but taking into account all the changing conditions that the cheese-maker must meet, we have no doubt the Cheddar plan is the safest. When the curd reaches the condition of dryness that your experience shows to be the most favorable, and will show about one-quarter inch of fine thread by the hot-iron test, the curd should be packed on the side of the vat, leaving a space in the middle for the surplus whey to drain off. After leaving a sufficient length of time for the curd to mat together, cut it in strips and turn it over. After allowing it to drain for a short time double it up, and continue to do so until you have the curd in a compact mass; then cover it up to retain the temperature, for it has been found that where the temperature is allowed to fall below ninety-two to ninety-four degrees, during this digestive process, that the activity of the rennet is impaired and too much moisture retained in the curd, which has a tendency to make a pasty, weak-bodied cheese. Whey should not be allowed to collect on the curd in pools during this time, but it should be repacked occasionally, and the outside pieces put inside so that the rennet may act on every part alike and the assimilation be perfect.

The time when the curd reaches the condition that it is ready to be ground and salted must be determined by its appearance. When it begins to feel mellow and velvety and has a stringy, fibrous texture, and a smell like fresh buttermilk, it is ready to be ground and salted. If at this time there should be developed a gassy or porous condition the acid development must be carried farther, or until the gas cells become flattened before grinding. After salting, the curd should be stirred for ten or fifteen minutes

before putting to press. After hooping the curd, the pressure should be light at first, gradually increasing. Cheese should be kept in the press at least eighteen hours, as they will retain their shape better. The curing-room should be so arranged that the temperature can be controlled and not allowed to go over seventy or seventy-two degrees, which is conceded to give the best results in curing the cheese. See to it that the ventilation is so arranged as to carry off all bad air, and the drainage such as to carry away the slops, not allowing them to lay around the factory to develop putrefaction.

You must not expect your patrons to take good care of their milk unless you practice what you preach.

OUR DAIRY INTERESTS.

MAKING BUTTER.

It has been well said "that making good butter is an art." I realize that it is a difficult thing to make any positive rules for the processes connected with the business, and it is also almost impossible to follow definite rules as the conditions are so varied and the circumstances so changeable and irregular. It is, however, a positive maxim that the more closely definite rules are followed and positive principles are observed, the more uniform will be the butter and the better its quality. This being a law, it is wise then to endeavor to know all we can of the principles involved in butter making, and to understand the reasons why poor results follow practices altogether too common. Canvas and paint are requisite for a painting, but with them there must be skill, if not genius, to so utilize them as to secure success. As in the productions of the real artist, skill must enter into the manufacture of dairy products in order to obtain the best results. With all rules, therefore, there must be careful observation and good judgment. The observation must be keen, and the judgment good and acute, so that it will not be governed on the one hand by prejudice or inherited customs, and on the other hand it will not be warped by the webs of conceit, or bound up by preconceived fancies or notions.

When the dairyman can free himself from these shackles, he will wisely select cows, for his butter dairy, of herds which are specially adapted for two purposes, and he will look carefully for the families which have made profitable records direct in his line. If he does not do this, he will be led to breed his cows in a way to secure the best results for butter making. The same progressive spirit and intelligent enterprise will lead a dairyman to test his herd, be they thoroughbred or native, to find out the individual capacity of each cow for the secretion of butter fats.

A test of the cows should be made without delay in every herd. No dairyman is pursuing an intelligent course until he does this. He may find that one-third of his cows are running him in debt every day, and he is likely to find that another third are barely paying their way, leaving only one-third of his herd which really afford any profit for their keeping and the labor bestowed upon them. The test may be made, for all practical purposes, by setting the milk of one day by itself and churning it; being careful to have the conditions as near alike for each cow and each test as possible. This simple effort to get at the foundation of the dairy will often let in a flood of light and astonish the owners of the cows. It seems to me that this examination of the foundations of our business is a necessity, and still not one dairyman in a hundred has ever done it. No dairyman knows where or how he stands as a business man until he tests the individual ability of all his cows for secreting butter fats.

Feeding.—The feeding comes next for careful consideration. The cow which has shown that she has less than three per cent of butter fats in her milk, when fed the same as those which have produced four per cent, may be condemned at once as not designed for a butter cow, nor for any use except to make beef, and the sooner her destiny is fulfilled the better. If a cow, on ordinary food, shows three and a half or, better, four per cent, of butter fats, with a careful test, she should be spared and be fed liberally with food calculated to make rich milk. If she responds to this feeling with more butter, she is deserving of further use in the dairy, until cows of a higher order of attainment can be procured. The dairyman should not stop short of five per cent of butter fats, and get as much higher as he can. This line of improvement swells the quantity, and thus we must have much above the present average in the State to make butter making remunerative. The feeding problem is one of commanding importance, and next to the value of the cow, and perhaps equal to it, as the good cow will be made poor in yield if not well fed. Many cows naturally good, or possessing all the physical development required for producing plenty of milk and milk rich in solids, cannot fill their natural mission because of a lack of food support. The excellent cow has not yet found a way to produce something for nothing. Man may, in his imagination, but the cow has no such miraculous power. She is an honest and most practical friend.

The foods which abound in starch, sugar and woody fiber, classed as carbonaceous, are not fitted alone to produce butter fats, or, perhaps, I should say, to produce milk rich in solids with a large per cent of butter fats. This is especially true if there is an excess of the woody fiber in the foods. How can we expect a cow, how-

ever industrious she may be, to make rich milk out of straw, dry ripe cornstalks, poor hay and any of the foods which we know are lacking in the real elements of nutrition? Thought will tell us this fact, and then we ought to know from observation that such foods make very little butter and of very poor quality. What shall we do then? Why, follow the law scientists have given us and unite with the carbonaceous foods the richer albuminoids in the foods which contain a larger per cent of nitrogen, or the foods which make muscle—real animal substance. The farmer may say right here that butter is not muscle; very true, but butter is fat, and if the cow must get all of her heat (animal life) and lubrication out of the weak and inefficient foods, straw, dry cornstalks and the like, where is she going to get the excess of fat required for producing butter? The muscles must be fed or there will be a lack of vitality and decay will follow. With the natural draft made by the system on the food, or rather the nutrients in the foods, the cow cannot consume enough of these coarse foods to have much, if any, surplus for the pail. Again, if she is fed the carbonaceous foods in a more concentrated form, they do not meet her entire physical requirements, and her nature demands the combining of both the muscle and the heat and fat-forming foods. By this combination she will eat more of both and digest more and produce more milk and more solids. This she does when she has fresh grass to eat, and in our attempts to feed the cow we should try to give her the balanced proportion of foods, as the cow gets them in a good pasture. This will insure butter of a uniform texture and balance in its elements. We can, therefore, never go amiss in giving our cows wheat, corn, oats, linseed and cotton-seed meal, peal meal, and other nitrogeneous foods with the hay, corn fodder, ensilage and straw.

The care of the milk.—This is the next natural consideration. It should be drawn from the cows as rapidly as possible to insure a good flow. The cow should be kept as quiet as possible during the milking, hence I recommend milking in the stable. The milk should not be left standing in any stable, and especially if the stable is in such a condition as to throw out taints, as the milk will take up these taints and hold them and they will go into the butter. Another reason why the milk should not be left in the stable is, it will cool and when strained it will have been reduced in its temperature. As a rule, however, when the milk is set for cream, the extremes of temperature between the setting and the cooling, whether by ice, cold water, or in the temperature of the room, should be about forty degrees. The natural or normal heat is ninety-eight degrees when taken from the cow.

The temperature in summer will fall, perhaps, to ninety degrees by the time the milk is strained and set. When this is the case the milk should be cooled down to fifty degrees at least. Many cool it down to forty-five degrees and even lower. The more the temperature is reduced the sooner the cream will rise, and it will come up very thin and the butter will not keep as well as when the cooling is not so rapid and the temperature reduced so low. Such thin cream requires more time to mature. When the milk is set in open pans, and the conditions are such that there will be but a small reduction in the temperature, down to sixty degrees, perhaps, as is the case in winter quite often, the milk should be warmed before setting to a degree of temperature which will admit of a falling of almost forty degrees to reach the temperature of its surroundings. This is a good rule to apply in the setting of milk in pantries, or quite warm milk-rooms. By the falling of the temperature of the milk, the butter globules come to the surface more rapidly, as the water or the milk is made more buoyant, and this condition, while it does not make the butter globules any lighter, it makes, for the time being, a greater difference between them and the milk because they are not affected by the cold as soon as water. A light stick will rise in the water sooner than a heavy one, and either would float better in salt water than in fresh, because the specific gravity of the salt water is the greatest. So is that of the chilled milk; and the specific gravity is increasing as the milk is cooling, while the butter fats remain about the same in their weight.

In the autumn and in winter the milk is liable to become viscid, or thick and sticky. When this is the case the milk should be diluted with water from ten to fifteen per cent. The water may be warmed up to 110 degrees and the double purpose obtained of warming the milk and at the same time making it thinner so that the cream can rise more freely. Cream is also liable to be too dry and thick in cold weather, especially when raised on open pans. It will be found that the butter will separate better if such thick cream is made thinner and softened by the addition of warm (not hot) water. Water may be added to the extent of ten to twenty per cent of the bulk of the cream.

The time of creaming.—This should not exceed, as a rule, more than twenty-four hours, as the milk is liable to become sour, and then no cream can rise because the cream cannot push its way through obstacles, and the clots of sour milk are obstacles enough to hold it back. Sour milk is no help to cream. When it is slightly sour it does not injure it if it is churned at once, but the trouble is the cream is very apt to be left too long in pans, and with this sour milk in it, it will rapidly become too much fermented in the cream

pail and go off flavor. To be safe, and to have our business under full control, we should endeavor to set our milk that the cream will all rise while the milk is still sweet. I am aware that a great deal of milk is set in common pans in our State, and under favorable conditions for the cream to rise before the milk becomes sour, and this I believe to be one of the main reasons why so much butter sent to market from private dairies is more or less rancid. I also know that when the conditions are favorable, and great care is exercised, as good butter can be made, and is made, under this system as by any other. Butter so made, and perfectly made, has excellent keeping qualities as the cream is ripened while in the pans by aeration. A great deal of butter is also made by a more wholesale system of large shallow pans and open pans, set so that cool water can run all around them. When the water is as cool as fifty degrees or below, as it sometimes is to forty-eight degrees, the cream will rise well, provided the milk is warm when it is set. Usually it is too cool to insure a full creaming. I must recommend to all such factories to warm up the milk before setting so as to secure the extremes I have named. From all the contingencies which are liable to arise, I think the creamer system and cooling the milk with ice or very cold water is the safest way to get the most cream and to keep it sweet so it can be handled to the best advantage. The sweet skim milk is soluble, and has more nutriment in it than sour milk. When any of the sugar in milk, or in any good food, is turned to acid, it has lost just so much of its feeding value. In the winter time, if the foods of the cows have been well balanced, the milk may set for thirty-six hours for the cream to rise, if it does not become sour or bitter. If left too long milk will become bitter, and so will the cream, owing to the presence of tannin in the hay, timothy especially. With long setting the tannin will separate from the other elements and become an active principle. There is also danger of the milk becoming separated and the most and longest coagulated changing into little pellets of cheese, which go into the cream and remain intact in the butter causing white specks. The cream, also, will dry out and become hard on the edges of the pan and turn white, become bleached in the strong light and also make white specks. Covering the cream will prevent this. There is no good argument in favor of the long setting of milk to get the cream, for it cannot be done without too many risks and too much injury to the cream to sustain the practice.

Handling of cream.—This is a delicate part of the process of butter making. If the cream is sour when taken from the milk it should be churned at once, and all of the cream which is sour before skimming can go into the churn together. If part of the cream is sweet that is a different thing. Sweet or unripe cream should

never be mixed before going into the churn, as they will not churn alike, and the butter will have two tastes or flavors, one of sweet cream and one of sour. The first skimming of cream should be kept in a cool temperature where it will undergo very little, if any, change, until the entire batch of cream designed for a churning is gathered, and then it should be well mixed and be set into a warmer temperature, where it will develop acidity in twenty-four or thirty-six hours. As a rule cream should be churned when not more than thirty-six to forty-eight hours old. In warm weather it may be best to churn every twenty-four hours. No exact time can be given for the cream to remain in the cream pail before churning. If the time for collecting a churning has been long, then the cream should be put into a temperature from seventy to eighty degrees and be kept there in order to hasten its ripening. If the time of gathering has been more rapid, not exceeding twenty-four hours, it may be left to ripen more slowly, and thirty-six to forty-eight hours may be allowed. This can be brought about by putting the cream in a moderately cool atmosphere of fifty-five to sixty-five degrees. The process called ripening is giving the cream time enough to slowly thicken, and to develop a small amount of lactic acid. This is not a rank sourness, but a pleasant acidity, which, when slowly developed, is not rank, nor does it send up such an amount of carbonic acid gas as to affect the looks and quality of the cream. A great deal of cream is spoiled under the head of ripening, because so many people think that acidity or sourness is ripening. It is not so in any such sense. Aeration and a slow development of a moderate taste and flavor of lactic acid is ripening, coupled with a thickening of the cream and the developing or manufacturing of the volatile oils, which constitutes such a small per cent of butter, but which are never at their best unless these conditions are observed. Extreme acidity results in no aroma or flavor except the aroma and flavor of sourness, coupled with a cheese taste and smell, or, as some term it, a sour-milk flavor. Such butter is never gilt-edged. The expert butter maker can tell well-ripened or perfectly matured cream at a glance. It has an appearance of its own. A bright, satiny and buttery look. Sour cream looks dull and rank. The butter maker must study this matter of ripening from his or her standpoint of breed of cows, manner of creaming, and all the surrounding conditions. There must be a constant effort to obtain perfection, and when it is reached the same method and painstaking must be followed all the time as far as circumstances will allow.

Churning.—This will require some variation in the temperature accordingly as the cream is sour or sweet. Acidity seems to be an aid in the separation of the butter globules, and churning is

more readily done. The cream in which the butter globules are small seems to require a higher temperature. I suppose this admits of the globules adhering more freely, just as they do in winter when the cream is warm, and as they will not readily if the cream is cold. The cream from any milk should, as a rule, be churned at a temperature of sixty-two degrees in summer, and at sixty-four to sixty-six degrees in cold weather. In summer, the butter should be cooled to fifty-eight degrees before taking it from the churn, and in winter it may be higher, and should be, to work well, say sixty degrees. If too cold, it will not gather or adhere in the worker, and if too warm, it will possess little, if any, grain. Churning should be moderate in motion and should take from twenty to thirty minutes.

Making the butter.—This is a simple process, but still it must be done well. If the churn is stopped when the butter is in small granules, it can be thoroughly cleansed from the buttermilk and the atoms of casein. This can better be done with a first course of brine after the buttermilk has been drawn off.

The brine will also harden the granules better than water and cut or clear the buttermilk from the butter more effectively than water alone. The butter should be washed in three or more waters, or until the water comes away clear. The work of cleaning the butter can be expedited by stirring the granules about in the churn with a paddle. A fine sieve will prevent the butter from wasting. The washing should always be done with the purest and best water. Soft water is preferable, as the lime in water will, if it is very strong, impart its flavor to the butter just as it does when there is considerable of lime in the salt used. A churn which is the most convenient in form and brings the butter by concussion is the best.

Working and salting.—This should be done without delay, as it does butter no good to stand exposed to the air. When well washed the working is not to get the buttermilk out, but to get the salt evenly incorporated in the butter. The working should be just enough to accomplish this object and then it should cease, as the more butter is worked beyond this point the poorer it will be. When the butter is washed clean it will be quite dry and the butter will, if it is well granulated, be so open or porous that the salt will find its way quite evenly through it and be turned into brine, which will, when the butter is pressed together, carry out with it what little buttermilk there may be in it. Some people work butter twice, in order to be sure that the salt is perfectly distributed throughout it, but this is not necessary, as a careful granulation and salting and moderate working will insure its freedom from spots or streaks which are caused by

not mixing the salt evenly through it. A fluted roller running on a wooden table is the most handy and effectual butter-worker. The general rule is an ounce of salt to a pound of butter.

The packing should be done as soon as the working is completed, while the butter is still plastic, and to keep it from the air and the damage of possible taints and the accession of the bacteria which produce putrefaction. The best package for long keeping is an oaken or ash tub. Spruce tubs do very well and are some cheaper. Under any circumstances the butter should not be put into the tub until it, the tub, has been soaked in scalding hot brine, and the tub should always be new. The butter should be covered with a salt paste and oil paper, and be kept in a dry, cool storeroom. A great deal of butter is spoiled by holding it in damp, moldy and unfit cellars.

There are some important things not to do, and among them is not to allow cows to feed in pastures full of rank and savory weeds, to drink out of stinking pools or impure water. All dead animals will taint the air, and consequently none should be left for any length of time on top of the ground. To keep the stables filthy and not to scald all the milking and cream vessels and worker and churn frequently is to invite and keep alive the germs of ferment and putrefaction. This sort of perpetuation of the butter maker's worst enemies must not be done. We must not expect to make all of our butter in the summer, when everybody else is doing the same thing, and calculate on as good returns as we would get if we extended the business through the winter. We cannot reasonably complain of low prices if we persist in making the kind of butter consumers do not want at the present time, and we should not put off the changing of methods with the idea that our way is best, for improvements and a progressive spirit do not wait nor travel backward.

Feeding rations.

The following milk rations are recommended by Professor E. W. Stewart, of New York, and will also be found in the Fifth Annual Report of the New York State Dairy Commissioner.

No. 1. Eighteen pounds oat straw; five pounds bean straw; six pounds cotton-seed meal.

No. 2. Twenty pounds barley straw; five pounds pea straw; two pounds wheat bran; five pounds linseed meal.

No. 3. Twenty pounds poor hay; five pounds corn meal; five pounds cotton-seed meal.

No. 4. Twenty pounds wheat straw; five pounds wheat bran; three pounds corn meal; four pounds linseed meal.

No. 5. Twenty pounds fresh marsh hay; five pounds corn meal; five pounds cotton-seed meal.

No. 6. Ten pounds good meadow hay; ten pounds rye straw; three pounds wheat bran; five pounds linseed meal.

The following are given by the same author as milk rations:

No. 1. Ten pounds clover hay; ten pounds straw; four pounds linseed-oil-cake; four pounds wheat bran; two pounds cotton-seed meal; four pounds corn meal.

No. 2. Sixteen pounds meadow hay; eight pounds wheat bran; two pounds linseed meal; six pounds corn meal.

No. 3. Eighteen pounds corn fodder; eight pounds wheat bran; four pounds cotton-seed meal; four pounds corn meal.

No. 4. Fifteen pounds straw; five pounds hay; four pounds cotton-seed meal; four pounds bran; four pounds corn meal; three pounds malt sprouts.

No. 5. Ten pounds corn fodder; ten pounds oat straw; two pounds linseed meal; four pounds malt sprouts; ten pounds oat and corn meal.

No. 6. Sixty pounds ensilage; five pounds hay; two pounds linseed meal; four pounds bran.

Fattening rations.

The following rations are for a thousand pounds of live weight of the animals fed:

No. 1. Eighteen pounds winter wheat straw; forty pounds corn-sugar meal; four pounds cotton-seed meal.

No. 2. Twelve pounds oat straw; ten pounds wheat bran; forty pounds corn-sugar meal.

No. 3. Twelve pounds clover hay; six pounds oat straw; forty pounds corn-sugar meal; two pounds linseed meal.

No. 4. Fifteen pounds corn fodder; five pounds malt sprouts; three pounds corn meal; forty pounds corn-sugar meal.

No. 5. Twenty pounds best clover hay; fifty pounds corn-sugar meal.

No. 6. Twenty pounds wheat straw; eight pounds timothy hay; six pounds cotton-seed meal.

No. 7. Twenty pounds corn fodder; six pounds Indian corn; six pounds linseed meal.

The following are rations for oxen at hard work, as given by Professor Stewart:

No. 1. Twenty pounds best meadow hay; ten pounds corn meal.

No. 2. Twenty pounds corn fodder; five pounds clover hay; two pounds wheat bran; three pounds cotton-seed meal.

No. 3. Seventeen pounds clover hay; three pounds wheat bran; ten pounds corn meal.

No. 4. Twenty-five pounds oat straw; five pounds wheat bran; four pounds linseed meal.

The following feeding rations are taken from Bulletin No. 17, new series, October, 1889, issued by the New York Agricultural Experiment Station:

	Pounds.	Albumi- noids, pounds.	Carbohy- drates, pounds.	Fat, pounds.
Hay	18	.54	6.82	.22
Wheat bran	5	.64	2.22	.22
Linseed meal	5	1.37	1.74	.36
	....	2.55	10.78	.80

Nutritive ratio, 1 : 4.9.

Cost per day, 20.6 cents.

Value of fertilizing matter in ration, 14 cents.

	Pounds.	Albumi- noids, pounds.	Carbohy- drates, pounds.	Fat, pounds.
Hay	18	.54	6.82	.22
Wheat bran	5	.64	2.20	.12
Corn meal	3	.19	1.84	.10
Cotton-seed meal	2	.72	.32	.27
	....	2.09	11.18	.71

Nutritive ratio, 1 : 6.2.

Cost per day, 19.6 cents.

Value of fertilizing matter in ration, 13 cents.

	Pounds.	Albumi- noids, pounds.	Carbohy- drates, pounds.	Fat, pounds.
Hay	20	.61	7.59	.24
Gluten meal	2	.31	1.03	.12
Wheat bran	5	.64	2.20	.12
Linseed meal	3	.82	1.04	.19
	....	2.38	11.86	.67

Nutritive ratio, 1 : 5.7.

Cost per day, 21.7 cents.

Value of fertilizing matter in ration, 13 cents.

	Pounds.	Albumi- noids, pounds	Carbohy- drates, pounds.	Fat, pounds.
Hay, red clover	18	1.07	6.12	.27
Wheat bran	5	.64	2.20	.12
Corn meal	6	.38	3.69	.20
Linseed meal	1	.27	.35	.07
	.....	2.36	12.36	.66

Nutritive ratio, 1 : 5.9.
Cost per day, 21.3 cents.
Value of fertilizing matter in ration, 14 cents.

	Pounds	Albumi- noids, pounds.	Carbohy- drates, pounds.	Fat, pounds.
Hay	15	.48	5.69	.18
Wheat bran	5	.64	2.20	.12
Corn meal	5	.32	3.07	.16
Linseed meal	3	.82	1.04	.19
	.....	2.26	12.00	.65

Nutritive ratio, 1 : 6.
Cost per day, 21.5 cents.
Value of fertilizing matter in ration, 13 cents.

	Pounds.	Albumi- noids, pounds	Carbohy- drates, pounds.	Fat, pounds.
Hay, red clover	8	.48	2.72	.12
Wheat straw	5	.04	1.73	.02
Ensilage, maize	30	.15	2.52	.24
Wheat bran	4	.57	1.72	.10
Corn meal	3	.19	1.84	.10
Cotton-seed meal	2	.72	.32	.27
	.....	2.15	10.85	.85

Nutritive ratio, 1 : 6.2.
Cost per day, 19.3 cents.
Value of fertilizing matter in ration, 12 cents.

	Pounds.	Albumi- noids, pounds.	Carbohy- drates, pounds.	Fat, pounds.
Wheat straw	20	.15	6.93	.07
Maize ensilage	30	.15	2.52	.24
Cotton-seed meal	2.5	.89	.40	.33
Linseed meal	1	.27	.35	.06
Wheat bran	4	.51	1.76	.10
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.....		2.33	11.96	.80
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Nutritive ratio, 1 : 7.1.

Cost per day, 18 cents.

Value of fertilizing matter in ration, 11 cents.

	Pounds.	Albumi- noids, pounds.	Carbohy- drates, pounds.	Fat, pounds.
Hay	15	.46	5.69	.18
Oats	5	.45	2.12	.20
Linseed meal	3	.82	1.04	.20
Corn meal	5	.32	3.07	.16
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.....		2.05	11.92	.74
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Nutritive ratio, 1 : 6.2.

Cost per day, 22.7 cents.

Value of fertilizing matter in ration, 11 cents.

	Pounds.	Albumi- noids, pounds.	Carbohy- drates, pounds.	Fat, pounds.
Maize stover	20	.65	9.67	.16
Wheat bran	3	.38	1.32	.07
Linseed meal	4	1.10	1.39	.25
Roots	12	.15	.65	.03
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.....		2.28	13.03	.51
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Nutritive ratio, 1 : 6.3.

Cost per day, 16.1 cents.

Value of fertilizing matter in ration, 10 cents.

	Pounds.	Albumi- noids, pounds.	Carbohy- drates, pounds.	Fat, pounds
Maize stover	13	.42	6.28	.10
Ensilage	25	.12	2.11	.19
Cotton-seed meal	2	.72	.32	.27
Wheat bran	5	.84	2.20	.12
Starch waste (dry)	4	.23	1.15	.10
	.....	2.13	12.06	.78

Nutritive ratio, 1 : 6.6.

Cost per day, 19.2 cents.

Value of fertilizing matter in ration, 11 cents.

The following feeding rations are some that have been fed by our New York farmers, and are published in the same bulletin above-mentioned:

ROCHESTER, N. Y.

Cows in herd, forty-nine; mostly Guernseys; average about six years old; average weight, 1,000 pounds, and cows go dry about six weeks.

Average milk yield in summer, fifteen quarts; average milk yield in winter, ten quarts.

Milk is all sold. At the time of report the daily feed was as follows:

	Pounds.
Corn stover	10
Corn ensilage	15
Sugar beets	10
Corn meal	5
Wheat bran	5
Ground oats	5

The amount of digestible matter in such a ration would be about as follows:

	Pounds
Albuminoids	1.88
Carbohydrates	14.32
Fat .....	.68

Nutritive ratio, 1 : 8.5.

The above ration, like most rations, according to German standards, is deficient in albuminoids and strong in carbohydrates.

ITHACA, N. Y.

Twelve cows; grade Holstein, three-fourths to fifteen-sixteenths, averaging 1,122 pounds live weight, and were yielding, February eighteenth, on an average, thirty pounds milk per day.

Milk is all sold for immediate consumption.

The daily feed was as follows:

	Pounds
Clover hay	9.58
Corn ensilage	42.
Mangolds	12.2
Corn meal	2.8
Wheat bran	2.
Cotton-seed meal	3.66

The digestible matter contained would be approximately as follows:

	Pounds.
Albuminoids	2.57
Carbohydrates	10.21
Fat	1.12

Nutritive ratio, 1 : 5.1.

The last ration, judged by the standard, would be considered well balanced, although the proportion of fat is in excess.

AVON, N. Y.

Nine grade Jerseys and one Holstein, weighing 1,000 pounds each. Cows go dry one to four weeks, and come in milk all the year round.

In summer the milk yield averages about eighteen quarts, and in winter ten quarts. The milk is all sold.

	Pounds.
Meadow hay (assumed).....	8
Corn stover (assumed).....	10
Bean straw	15
Beets .....	....
Corn meal	8
Wheat bran	8
Linseed meal	1

The amounts of hay, stover and straw are not given, but from report apportioned as above.

It is hardly possible that the animals consumed all the coarse food as indicated above as, when fed straw, a portion is generally uneaten.

As the figures stand, the digestible matter would be:

	Pounds.
Albuminoids	2.77
Carbohydrates	17.50
Fat .....	.76

Nutritive ratio, 1 : 6.9.

The grain ration indicated is a very liberal one, and the total amount is in excess of the standards, but the proportions lean toward carbohydrates.

BROCKPORT, N. Y.

Twelve cows in herd; Jersey breed, and cows go dry about one month.

Annual butter product, per cow, 320 pounds.

The feed per day when reported was as follows:

	Pounds
Meadow hay	12
Corn meal	3
Wheat bran	3
Linseed meal	3
Oatmeal	3

The proprietor writes that he feeds more of fodder corn than hay. The corn fodder taking the place of hay, and cows have all they will eat, the grain being the same, he sees no difference in results.

The digestible matter contained in the above ration is found to be as follows:

	Pounds
Albuminoids	2.03
Carbohydrates	10.03
Fat .....	.63

Nutritive ratio, 1 : 5.7.

This ration is very close to what American experience seems to indicate as a profitable and economical ration. The performance of the animals (320 pounds of butter per year) confirms the opinion. The ration employed is worthy of study by dairymen who wish to combine their foods in a profitable ration for milch cows.

HOLLAND PATENT, N. Y.

The herd consists of eleven Jerseys and grade Jerseys. Cows go dry about three weeks, and come in milk at all seasons.

Average annual milk yield, about 5,000 pounds.

Average butter per cow, annually, 300 pounds.

The following was the ration fed at date of report:

	Pounds.
Meadow hay	3
Corn ensilage	40
Wheat bran	4
Cotton-seed meal	2

The above ration calculated for digestible matter is as follows:

	Pounds.
Albuminoids	1.52
Carbohydrates	6.59
Fat .....	.71

Nutritive ratio, 1 : 4.5.

According to German standards this ration would be considered perfectly balanced as regards the relation of albuminoids to carbohydrates. The interesting feature is the small amount of dry matter consumed per day by the animals. When we consider the returns given by the cows, an average annual butter product of 300 pounds, it is evident the food is well digested and assimilated by the animals.

The following feeding rations have been clipped recently from the pages of "The Country Gentleman":

	Albumi- noids, pounds.	Carbo- hydrates, pounds.	Fat, pounds.
Thirty pounds sweet corn ensilage .....	.36	3.60	.15
Five pounds common hay.....	.20	1.76	.05
Eight pounds ground damaged wheat...	.77	5.28	.14
Four pounds hominy chops.....	.32	2.04	.21
Three pounds cotton-seed meal.....	1.05	.66	.18
Total	2.70	13.34	.73

This has a nutritive ratio of 1 to 5.5, and is an excellent milk and butter ration, and with good cows should produce an excellent yield.

	Albumi- noids, pounds.	Carbo- hydrates, pounds.	Fat, pounds.
Fourteen pounds clover hay .....	.98	5.60	.21
Six pounds corn meal .....	.50	3.78	.29
Four pounds ground oats .....	.36	1.84	.16
Four pounds fine bran.....	.47	1.84	.10
Two pounds linseed meal .....	.56	.60	.12
Total	2.87	13.66	.88

This has a nutritive ratio of 1 to 5.5. In this case the clover hay must be cut and moistened, and the ground oats, corn meal, fine bran, linseed meal mixed thoroughly with it and given in three feeds. This should produce the best flavored milk and butter, and keep the cow in fine health and condition.

	Albumi- noids, pounds.	Carbo- hydrates, pounds.	Fat, pounds.
Sixteen pounds meadow hay .....	.86	6.56	.16
Eight pounds ground corn and rye ....	.69	5.12	.19
Six pounds bran .....	.70	2.76	.15
Two pounds cotton-seed meal .....	.70	.44	.12
Total	2.95	14.88	.62

This has a nutritive ratio of 1 to 5.5, and will produce a good quality and large quantity of milk when fed to good cows.

	Albumi- noids, pounds.	Carbo- hydrates, pounds.	Fat, pounds.
Sixteen pounds short cut corn fodder..	.30	5.25	.07
Five pounds clover and timothy .....	.30	2.00	.07
Nine pounds ground corn, rye and oats..	.76	5.23	.28
Ten pounds wheat bran	1.17	4.46	.15
Total	2.53	16.94	.57

But this is better:

	Albumi- noids, pounds.	Carbo- hydrates, pounds.	Fat, pounds.
Twelve pounds corn fodder .....	.24	4.20	.06
Five pounds clover and timothy .....	.30	2.00	.07
Nine pounds corn, rye and oats .....	.76	5.23	.28
Eight pounds wheat bran .....	.94	3.60	.12
Two pounds cotton-seed meal .....	.70	.44	.12
Total	2.94	15.47	.65

The first ration has a nutritive ratio of 1 to 7.4, while second ration has a ratio of 1 to 5.7. The latter ration would probably cost but a trifle more.

	Albumi- noids, pounds.	Carbo- hydrates, pounds.	Fat, pounds.
Fourteen pounds clover hay .....	.98	5.60	.21
Six pounds corn and oats .....	.52	3.11	.28
Eight pounds ground wheat screenings ..	.72	4.32	.20
Fifteen pounds pulped carrots .....	.21	1.87	.03
Total	2.43	14.90	.72

This has a nutritive ratio of 1 to 6.8, a little too wide for the best butter ration. But if we substitute two pounds of cotton-seed meal for two pounds of wheat screenings, we narrow the nutritive ratio down to 1 to 5.4, a very good butter ration.

The following ration is for cows and horses:

	Albumi- noids, pounds.	Carbo- hydrates, pounds.	Fat, pounds.
Forty pounds corn ensilage .....	.48	4.80	.21
Eight pounds meadow hay .....	.43	3.28	.08
Eight pounds wheat middlings .....	.93	3.92	.21
Three pounds cotton-seed meal	1.05	.66	.18
Total	2.89	12.66	.68

This has a nutritive ratio of 1 to 5.

It would not be safe to feed brood mares much cotton-seed meal, especially while in foal. Horses may have two pounds of cotton-seed meal per day safely, and brood mares the same when suckling foal. He may make up the following ration for his horses: Four pounds cut corn fodder; eight pounds cut millet hay; ten pounds wheat middlings or ground oats; and the horses that are subjected to regular work may have two pounds of cotton-seed meal.

It must be understood that the cut corn fodder and millet hay are slightly moistened, and the wheat middlings and cotton-seed meal well mixed in and given in three feeds, smallest at noon. Cotton-seed meal must not be fed to horses without mixing with coarse fodder. It will soon produce colic and congestion.

Brood mares without labor may be fed the above amount of coarse fodder, with six to eight pounds of wheat middlings mixed in, according to size and condition. This would keep them in condition and health.

DAIRY LAWS.

The following provisions of our dairy laws are worthy of careful attention, because they are in the interest of both the producer and consumer. The price, quality and reputation of our State dairy products can only be maintained by faithful observance of these enactments.

Chapter 183 of the Laws of 1885, as amended, enacts as follows:

No person or persons shall sell or exchange, or expose for sale or exchange, any unclean, impure, unhealthy, adulterated or unwholesome milk, or shall offer for sale any article of food made from the same, or cream from the same. The provisions of this section shall not apply to skimmed milk sold for use in the county in which it is produced, and in the adjoining counties, except in New York and Kings counties (where it shall apply), provided it is sold for and as such. This provision shall not apply to pure skim cheese made from milk which is clean, pure, healthy, wholesome and unadulterated, except by skimming. (Section 1.)

It also contains the following provisions:

No person shall keep cows for the production of milk for market, or for sale or exchange, or for manufacturing the same, or cream from the same, into articles of food, in a crowded or unhealthy condition, or feed the cows on food that is unhealthy or that produces impure, unhealthy, diseased or unwholesome milk. No person shall manufacture from impure, unhealthy, diseased or unwholesome milk, or of cream from the same, any article of food. (Section 2.)

No person or persons shall sell, supply or bring to be manufactured to any butter or cheese manufactory, any milk diluted with water, or any unclean, impure, unhealthy, adulterated or unwholesome milk, or milk from which any cream has been taken (except pure skim milk to skim cheese factories), or shall keep back any part of the milk commonly known as "strippings," or shall bring or supply milk to any butter or cheese manufactory that is sour (except pure skim milk to skim cheese factories). (Section 3.)

Any disobedience of these provisions is a misdemeanor punishable by fine or imprisonment, or both, and also renders the violator liable to the civil penalty imposed by statute.

After distributing this circular where it would be useful the instructors began work by attending such gatherings as was provided by law that they should attend and gave instructions to those

there gathered. Those instructions consisted first of proper information as to methods of producing butter and cheese, and of lectures and discussions upon the method of selecting, feeding and caring for the cattle, and upon the best manner of caring for the milk product; especial attention being called to caring for the milk. Aeration being one of the features of that care that was insisted upon. It is pretty generally understood to-day that the cheese factories in this State that are producing the most desirable product look after the aeration of the milk, and the care and feeding of the cattle producing the milk, which they manufacture into cheese. Many peculiar things have been called to the attention of these men, during the time they have performed their work, and it is not infrequent that their methods have been criticised; not that they were wrong, but because they were misunderstood or misapplied. As an illustration, a party who had prepared to aerate his milk in order to relieve it from the animal odors or gases that had been in it theretofore, when delivering it to the factory, complained after using the aerator for a time that his milk was worse than before. This statement was corroborated by the cheese-maker and investigation showed that he prepared his aerator and was using it, but that he was so using it that the air that blew through the milk during the operation was first blown over a pile of manure or decaying substances, thereby putting more taint into the milk than the air could possibly take out. Upon his attention being called to this he changed the place of the operation and the difficulty ceased. There are many instances of this kind.

During the year the cheese instructors have done some work in connection with the experiment station at Geneva, with a view of ascertaining by actual experiment in manufacturing the cheese from milk of a known constituency and condition, and then analyzing the cheese for the purpose of determining certain results. Among other things the experiments there tend to show that the fat is the main feature in the milk solids controlling the amount of cheese product.

Experiments were performed in making cheese from milk that was skimmed, partially skimmed, normal milk, and normal milk

to which cream had been added. These experiments showed that as the amount of fat was increased in the milk, the amount of cheese product was nearly proportionately increased. The conclusion drawn from this is that the showing of their work on these lines is to the effect that the amount of fat in the milk would be the best basis upon which to determine its value for cheese-making. If these experiments are conclusive, they settle a question that has been under discussion for some time, namely, what is the proper basis for paying for milk delivered at a cheese factory.

It has been claimed by some, and the claim is not without its merit, that the present method of paying for milk at the factory by the pound was an incentive or inducement to dairymen to get cows that would produce quantity, even if it were at the expense of quality. While it has generally been considered an inequitable way to determine the value of the milk brought to the factory, the great question has been what more equitable method could be taken as a basis for determining the value of the milk. If these experiments have answered that question, as our cheese instructors seem to think they have, then they are of great value. The results of these experiments are embodied in the reports of W. W. Hall and Geo. A. Smith, cheese instructors, and appear in this volume as a part of the appendix.

MILK COWS.

There are in this State, producing milk either for consumption or to be manufactured into butter, cheese or condensed milk, 1,552,923 milk cows. By far the greater portion of them are kept in the rural districts and are fed during a portion of the year by grazing, and are housed during the winter season, at which time the flow of milk is greatly decreased, if it does not entirely cease. There are, however, a great number of cows at a distance not remote from the larger cities, and in those cities, which are kept in stables during the greater portion, if not during the entire year, and are fed for the sole purpose of producing milk for consumption. To this class of milk cows the attention of this department is more especially directed than to the other,

as their keeping is of such a nature as to tend to produce conditions which would be a violation of the statutes of this State, if the violation is to occur at all.

The particular section of the statute referred to reads as follows:

§ 2. No person shall keep cows for the production of milk for market, or for sale or exchange, or for manufacturing the same, or cream from the same, into articles of food, in a crowded or unhealthy condition, or feed the cows on food that is unhealthy, or that produces impure, unhealthy, diseased or unwholesome milk. No person shall manufacture from impure, unhealthy, diseased or unwholesome milk, or cream from the same, any article of food. Whoever violates the provision of this section is guilty of a misdemeanor, and shall be punished by a fine of not less than twenty-five dollars nor more than two hundred dollars, or by imprisonment of not less than one month or more than four months, or by both such fine and imprisonment, for the first offense, and by four months' imprisonment for each subsequent offense.

The reports of the assistant commissioners, hereto attached, show that the cows kept in stables for the production of milk for city consumption have been examined, and the stables examined to as great an extent as the conditions would permit. That, as a whole, the cows are better housed, fed and cared for than before the supervision was exercised in this direction. Tuberculosis exists, or has existed, in different parts of the State, as these reports show. The efforts of the department have been directed to stopping the sale of the product of such cows; in all cases they have succeeded in so doing. This is a matter that should receive the careful consideration of your honorable body, as it is, I understand, a disease which may be communicated through the milk to the human family. I am informed that it is consumption, and is so called when it affects the human race. If this disease in cattle is a source of danger to the people of the State, that is, if the disease — consumption — is being nurtured and spread through the milk supply, as it is possible that it may be, then it is incumbent, in my judgment, upon those who have power in the premises, to do all that is possible not only to prevent its spread but to stamp it out entirely.

- For the particulars of the special cases to which the attention of this department was called, see the reports of the assistant commissioners hereto attached, also the report of Dr. R. D. Clark, a chemist and physician who is connected with this department.

VINEGAR.

The Legislature of 1889 provided, by chapter 515 of the Laws of 1889, against manufacturing, producing, selling or keeping for sale, vinegar not having an acidity of at least four and one-half per centum of acetic acid or less than two per centum of cider vinegar solids, as follows:

Section 1. No person shall manufacture, produce, sell, keep for sale, or offer for sale any vinegar which shall not have an acidity equivalent to the presence of at least four and one-half per centum by weight, of absolute acetic acid, or any cider vinegar which shall have less than such amount of acidity, or less than two per centum by weight, of cider vinegar solids upon full evaporation over boiling water.

§ 2. No person shall manufacture, produce, sell, keep for sale or offer for sale any vinegar or product in imitation or semblance of cider vinegar which is not cider vinegar.

§ 3. No person shall sell, keep for sale or offer for sale as or for cider vinegar any vinegar or product which is not cider vinegar.

§ 4. No person shall manufacture, produce, sell, keep for sale or offer for sale any vinegar which shall contain any preparation of lead, copper, sulphuric acid or other ingredients injurious to health, or any artificial coloring matter.

§ 5. Every manufacturer or producer of cider vinegar shall plainly brand on each head of the cask, barrel, keg or other package containing such vinegar, his name and place of business, and the words "cider vinegar" and no person shall label or brand as or for cider vinegar any package containing vinegar which is not cider vinegar.

§ 6. Whoever, by himself or another, violates any of the provisions of any of the foregoing sections shall be guilty of a misdemeanor and, upon conviction, shall be punished by a fine of not less than fifty dollars nor more than one thousand dollars.

§ 7. If any person, by himself or another, shall violate any of the provisions of sections one, two, three, four or five of this act he shall in addition to the fines and penalties herein prescribed for each offense, forfeit and pay a fixed penalty of two hundred dollars

for each offense. Such penalties shall be recovered with costs in any court in this state having jurisdiction thereof, in an action to be prosecuted by the New York State Dairy Commissioner or any of his assistants in the name of the people of the State of New York.

§ 8. The prosecution shall not be compelled to elect in any trial for the misdemeanors or suit for the penalties for the violation of sections one, two, three, four or five, where the indictment, information or complaint charges a violation of any two or more of such sections, between the charges or counts under such different sections.

§ 9. The New York State Dairy Commissioner is charged with the enforcement of the provisions of this act. The sum of five thousand dollars is hereby appropriated to be paid for such purposes out of any moneys in the treasury not otherwise appropriated, and the sum shall be paid by the Treasurer of the State upon the warrant of the Comptroller upon the certificate of the State Dairy Commissioner. The entire expense of the said commission in the enforcement of the provisions of this act shall not exceed the sum appropriated for the purposes aforesaid. Such Commissioner shall include in his annual report to the legislature a statement in detail of his work and proceedings, the number of assistant commissioners, chemists, experts, agents and counsel employed under the provisions of this act, and their compensation, expenses and disbursements. The said Commissioner and assistant commissioners, and such experts, chemists, agents and counsel as they shall duly authorize for the purpose shall have full access, egress and ingress to all places of business, factories, buildings where vinegar is made, produced, sold or kept for sale. They shall also have power and authority to open any cask, barrel, keg or other package containing or believed to contain vinegar manufactured, produced, sold, kept for sale, or offered for sale, in violation of the provisions of this act, and may inspect the contents thereof and take therefrom samples for examination and analysis. When any officer authorized by this act to inspect vinegar offered for sale shall in the discharge of his duties take samples of vinegar it shall be his duty to take duplicate samples thereof, in the presence of at least one witness, and he shall, in the presence of such witness, seal both of said samples, and shall tender, and if accepted, deliver, at the time of such taking, one sample to the vendor of said vinegar, or to the person having custody of the same, with a statement in writing of the cause of the samples having been taken.

§ 10. For the purposes of this act, the term "cider vinegar" shall be understood to mean vinegar made exclusively of pure apple juice. Sections one, two and four shall not apply to any vinegar

or produce manufactured or in process of manufacture at the time of the passage of this act, but the provisions of law existing at the time of the passage of this act shall apply thereto.

§ 11. Chapter six hundred and six of the laws of one thousand eight hundred and eighty-six, and chapter six hundred and thirty-four of the laws of one thousand eight hundred and eighty-seven, are hereby repealed, but any violation thereof committed prior to the taking effect of this act may be prosecuted under the provisions of such law as they existed prior to the passage of this act.

§ 12. This act shall take effect immediately.

There have been but few prosecutions under the vinegar law in the first division of the State. What there has been were so brought as to be in good shape to test the validity of the law should they be appealed. They were as follows:

CASE No. 180.

People v. J. J. Shea.

The information in this case was laid before the police magistrate of the city of Schenectady, and the defendant gave bail to appear before the grand jury. He was indicted, and the case was moved for trial at the Oyer and Terminer, September 16, 1891, and was tried before Tappen, J., with jury. The jury disagreed and the case was again moved for trial in the Oyer and Terminer, April 11, 1892, before Russell, J., who sent it to the General Sessions in Schenectady county on the ground that that was the place to try the case for misdemeanor; the case was moved in that court May 18, 1892, and tried before Cutler, J., and the jury disagreed. As yet no further action has been taken.

CASE No. 177.

People v. Stewart & Wilson.

This sample was taken January 15, 1891, and information was laid before the police magistrate in the city of Troy; evidence on the part of the plaintiff was introduced, after which the police justice discharged the defendants on the ground that the prose-

cution had not shown that the defendants sold vinegar that was unwholesome and unhealthful. The case was presented to the next grand jury that convened in Rensselaer county, and the jury failed to find an indictment. Civil action was brought in the Supreme Court immediately thereafter, for a penalty, under section 7 chapter 515 of the Laws of 1889, and the case was duly noticed for trial and placed upon the calendar, but was not reached until October 4, 1892, when it was tried before Edwards, J., and a jury. Judgment was rendered against the defendant for \$200 and costs. This penalty has not yet been collected, as it is claimed that the defendant is insolvent.

The reports of the assistant commissioners relative to the work they have performed show that there have not been a great number of prosecutions for violation of the vinegar law. There are several reasons for this, one of which is, that the money at command will not warrant us in bringing a great number of cases, for, as the law now stands, we cannot bring them in the court of Special Sessions, which involves bringing them in the higher courts; cases brought there move slowly, and a dozen in a locality, moving so slowly would have no more effect than one or two well prosecuted, and would be more expensive, and the expense is an item that we have to consider.

The reason these cases cannot be brought in the court of Special Sessions is, that the lowest fine that can be imposed under the vinegar law, so called, is fifty dollars, whereas the maximum fine that the court of Special Sessions can impose, as provided by the code, is fifty dollars. This leaves our vinegar cases in such shape that we are obliged to bring them in the higher courts.

There are several vinegar concerns, notable among which is one located at Detroit, Michigan, which seem, from the information I have, determined to place their goods on our markets, irrespective of the laws of this State. Their contention is that our law is invalid, and some of the courts have held in a way to encourage them to some extent, notably in the case against J. J. Shea,

above referred to. The construction placed upon section 2 of chapter 515 of the Laws of 1889, by the court was such as to render its enforcement a practical impossibility in my judgment.

That section reads as follows:

§ 2. No person shall manufacture, produce, sell, keep for sale or offer for sale, any vinegar or product in imitation or semblance of cider vinegar, which is not cider vinegar.

The court held that that should be construed to mean that they should not keep any vinegar described by the section for sale, etc., as and for cider vinegar, in other words given by the court, would be as follows: "No person shall manufacture, produce, sell, keep for sale or offer for sale, any vinegar or product in imitation of cider vinegar which is not cider vinegar as and for cider vinegar," holding at the time that the evidence necessary to show that it had been so kept would be such evidence as would show a sale of such material as or for cider vinegar.

Such a construction, if held by the court of last resort, would leave it in such way that manufacturers of all kinds of vinegar other than cider vinegar, can legitimately make their product in such close resemblance or imitation of cider vinegar that the product will tend to deceive any person who may purchase it.

This case being a criminal one the people could not appeal.

This question has not been presented in the vinegar cases to the Court of Appeals, although the same principles have been before the court in the oleomargarine cases, notably the case of *The People against Arensberg*, where they held under a statute similarly drawn, relative to oleomargarine, that if the commodity was in such imitation or semblance as to be well intended to deceive any who might purchase that it was a violation of the law and that the law was constitutional.

The holding in the case above referred to (*The People v. Shea*) is, without doubt, in conflict with the holding in the case of *The People v. Arsenberg*. It appears to be neces-

sary, under the circumstances, that that question must be presented to the court of last resort in a vinegar case in order that we may get such holdings in all of the lower courts.

We have several cases now in the Supreme Court which are being contested and we confidently expect that if they go to the Court of Appeals we will have that question finally passed upon.

Since the enactment of the law it has been criticised by some to the effect that the standard provided for in section 1 was too high, those holding these views claiming that apples grown in certain sections of the State will not produce a cider vinegar containing more than four per centum of acetic acid, and that apples from any section of the State ripened in a certain time of the year would not produce that amount of acetic acid.

As your honorable body is aware a bill was before you at the last session lowering the standard to four per cent of acetic acid; this bill did not become a law for the reason that it was finally concluded that the evidence produced was not sufficient to determine the questions upon which the advocates of the bill based their claim for its passage.

This department was called upon to furnish the facts lacking or to give such facts as it might possess to determine the question involved; unfortunately we were not in possession of these facts to do so. In view of these and the further fact that we were informed by a member of the Senate that a bill would be introduced early in the session I have taken steps to procure such data as was within my power to do bearing upon this question. To that end I pursued two methods. First. Sending circulars to the cider vinegar manufacturers of the State requesting their opinion upon this question. Second. I requested Dr. R. D. Clark, department chemist, to conduct a series of experiments in his laboratory by manufacturing from apples from different sections of the State cider, and from that cider to manufacture cider vinegar, and then analyze that vinegar to determine as nearly as he might as much as possible relative to this mooted question.

The following is a copy of the vinegar circular sent to more than 2,000 manufacturers in this State:

Vinegar Circular.

Sir.—Desiring information of a practical kind in relation to cider vinegar, I have concluded to ask the manufacturers of the State to furnish it. With that end in view, I have prepared a list of questions which I inclose herewith.

This information is desired for the purpose of giving the Dairy Commissioner certain knowledge that may be laid before the Legislature during its next session, to the end that if supplementary or amendatory legislation be enacted that there may be practical data upon which it can be based.

With this statement of the reason for the question, I most respectfully request you to fill out the following blank and return the same to this office at your earliest convenience, and oblige,

Yours respectfully,

J. K. BROWN,

New York State Dairy Commissioner.

1. Are you a manufacturer of cider vinegar?
2. How long have you been such?
3. How much do you manufacture during one season?
4. Where do you get your cider or cider vinegar stock?
5. Where is the fruit grown from which the cider or stock you use is made?
6. Do you manufacture a uniform or a varying strength of vinegar as to acidity?
7. If uniform, what is the percentage of the acidity?
8. If varying (a), what is the lowest percentage of acidity that you manufacture? If varying (b), what is the greatest percentage of acidity?
9. Do you have any difficulty in producing, in pure cider vinegar, 4.5 per cent of acidity?
10. If you do have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?
11. If so, what are those conditions?
12. Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?
13. If so, what?
14. Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?
15. If so, how?

16. Is there any apple-growing section in this State where the ripened fruit will not produce a vinegar containing 4.5 per cent of acetic acid?

17. If so, where?

18. The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been made and is still being made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.

The experiments performed by Dr. Clark are set forth at length in his report hereto attached. The replies to this circular, with a summary of the same, will be found following the report of Dr. R. D. Clark, department chemist. I refrain from drawing conclusions relative to this matter, respectfully placing at your disposal the facts as returned to me.

The following is a report in detail of the assistant commissioners, experts, chemists, agents and counsel employed during the fiscal year ended September 30, 1892, together with a statement of their expenses and disbursements:

PAYEE.	Position held.	Date of check.	Compensa- tion.	Expenses.
James H. Brown.....	Assistant commissioner.....	1891. October 8	\$100 00	\$43 21
George L. Flanders.....	Assistant commissioner.....	" 8	.....	103 42
J. W. McMahon.....	Assistant commissioner.....	" 8	166 66	39 84
Peter H. Parker.....	Assistant commissioner.....	" 8	100 00	79 45
Patrick J. Sutley.....	Assistant commissioner.....	" 8	166 67	55 80
F. D. Tuthill.....	Assistant commissioner.....	" 8	150 00	35 58
B. F. Van Valkenburgh.....	Assistant commissioner.....	" 8	208 33	27 79
Geo. J. Zillig.....	Assistant commissioner.....	" 8	166 66	18 07
Samuel Abrams.....	Expert and agent.....	" 8	100 00	16 58
Grove Barnum.....	Expert and agent.....	" 8	80 00	22 45
Charles Burke.....	Expert and agent.....	" 8	80 00	67 30
Thomas Byrnes.....	Expert and agent.....	" 8	65 34	66 20
John E. Cady.....	Expert and agent.....	" 8	75 00	107 71
A. D. Clark.....	Expert and agent.....	" 8	100 00	70 26
John J. Coughlin.....	Expert and agent.....	" 8	100 00	13 31
Robert Dalzell.....	Expert and agent.....	" 8	84 00	80 60
A. S. Delano.....	Expert and agent.....	" 8	100 00	36 69
T. C. DuBois.....	Expert and agent.....	" 8	100 00	67 73
Frank E. Geise.....	Expert and agent.....	" 8	90 00	9 47
Michael Galligan.....	Expert and agent.....	" 8	75 00	18 70
T. R. Gray.....	Expert and agent.....	" 8	100 00	70 45
O. C. Griffis.....	Expert and agent.....	" 8	80 00	83 60
W. W. Hall.....	Cheese instructor.....	" 8	130 00	80 13

Charles Kellogg.....	Expert and agent.....	8	63 00	81 57
Wm. W. Meeteer.....	Expert and agent.....	8	100 00	76 80
M. T. Morgan.....	Cheese instructor.....	8	130 00	96 43
Chas. J. Morganstern.....	Expert and agent.....	8	80 00	43 08
Geo. W. Price.....	Expert and agent.....	8	80 00	69 27
H. A. Rees.....	Cheese instructor.....	8	78 00	59 08
Hoffman Ruger.....	Expert and agent.....	8	75 00	12 62
Charles Sears.....	Expert and agent.....	8	80 00	77 92
Geo. A. Smith.....	Cheese instructor.....	8	150 00	66 54
J. J. Sorogan.....	Expert and agent.....	8	100 00	44 92
W. G. Spence.....	Expert and agent.....	8	90 00	44 10
Robert C. Turner.....	Expert and agent.....	8	100 00	13 24
E. S. Wilson.....	Expert and agent.....	8	100 00	69 41
R. D. Clark.....	Chemist.....	8	50 00	2 33
F. E. Englehardt.....	Chemist.....	8	12 00	30
Theodore Deecke.....	Chemist.....	8	50 00	.....
Joseph F. Geisler.....	Chemist.....	8	61 90	3 34
Harry Snyder.....	Chemist.....	8	19 00	75
Stillwell & Gladding.....	Chemists.....	8	47 50	75
Wm. Manlius Smith.....	Chemist.....	8	27 00	3 57
David Suits.....	Counsel.....	8	75 00	.....
Wm. T. Wycoff.....	Counsel.....	8	20 00	.....
Chas. Van Loon.....	Laborer.....	8	30 00	.....
Weed, Parsons & Company.....	Printing.....	8	.....	144 77
F. P. Vandenbergh.....	Chemist.....	10	100 00	.....
John H. Foley.....	Assistant commissioner.....	15	150 00	.....
George Bernhard.....	Expert and agent.....	15	100 00	37 97
Walter Corbett.....	Expert and agent.....	15	80 00	24 40
A. R. Eastman.....	Expert and agent.....	15	20 00	13 01
Geo. B. Fellows.....	Expert and agent.....	15	.....	10 34
W. B. Howard.....	Expert and agent.....	15	75 00	59 81

DETAILED STATEMENT — (Continued).

PAYEE.	Position held.	Date of check.	Compensation.	Expenses.
Marcus A. Perry	Expert and agent.....	October 15	\$100 00	\$72 28
Joseph M. Quigley	Expert and agent.....	" 15	100 00	10 32
Geo. B. Taylor	Expert and agent.....	" 15	75 00	35 69
L. E. Scrafford	Expert and agent.....	" 15	75 00	51 07
James W. Walsh	Expert and agent.....	" 15	80 00	46 62
W. E. McDuffie	Chemist	" 15	100 00	13 16
Samuel A. Lattimore	Chemist	" 15	100 00	.....
McNaughton & Taylor	Counsel	" 15	75 00	.....
Simon Nussbaum	Expert and agent.....	" 26	100 00	12 55
John M. Hutchings	Stenographer	" 27	40 00	.....
Charles Burke	Expert and agent.....	" 27	80 00	40 45
J. K. Brown	Dairy commissioner.....	" 30	250 00	.....
George L. Flanders	Assistant commissioner.....	" 30	166 66	.....
George B. Fellows	Expert and agent.....	" 30	100 00	.....
R. D. Clark	Chemist	" 30	166 66	.....
George L. Flanders	Assistant commissioner.....	November 7	.....	62 55
James H. Brown	Assistant commissioner.....	" 16	100 00	37 06
John H. Foley	Assistant commissioner.....	" 16	150 00	.....
J. W. McMahon	Assistant commissioner.....	" 16	166 66	69 35
B. F. Van Valkenburgh	Assistant commissioner.....	" 16	208 34	61 15
George J. Zillig	Assistant commissioner.....	" 16	166 66	13 16
Samuel Abrams	Expert and agent.....	" 16	100 00	16 62
George Bernhard	Expert and agent.....	" 16	100 00	13 14
Thomas Byrnes	Expert and agent.....	" 16	52 50	58 55
Arch D. Clark	Expert and agent.....	" 16	100 00	55 58

W. J. Corbett.....	Expert and agent.....	16	80 00	24 05
John J. Coughlin.....	Expert and agent.....	16	100 00	15 45
A. S. Delano.....	Expert and agent.....	16	100 00	50 78
Michael Halligan.....	Expert and agent.....	16	75 00	19 78
Frank E. Geise.....	Expert and agent.....	16	90 00	15 08
T. R. Gray.....	Expert and agent.....	16	100 00	34 11
O. C. Griffin.....	Expert and agent.....	16	80 00	80 88
W. W. Hall.....	Cheese instructor.....	16	135 00	84 55
George S. Hutchinson.....	Expert and agent.....	16	9 00	7 04
Charles S. Kellogg.....	Expert and agent.....	16	81 00	92 90
William W. Meeteer.....	Expert and agent.....	16	100 00	55 60
M. T. Morgan.....	Cheese instructor.....	16	135 00	100 57
Marcus A. Perry.....	Expert and agent.....	16	100 00	61 12
R. H. Palmer.....	Expert and agent.....	16	80 00	59 43
William T. Peaslee.....	Expert and agent.....	16	78 00	35 62
William T. Peaslee.....	Expert and agent.....	16	80 00	37 10
George W. Price.....	Expert and agent.....	16	80 00	52 49
Joseph M. Quigley.....	Expert and agent.....	16	100 00	15 18
Hoffman Ruger.....	Expert and agent.....	16	75 00	10 04
L. E. Scrafford.....	Expert and agent.....	16	75 00	18 03
George A. Smith.....	Cheese instructor.....	16	150 00	63 92
W. G. Spence.....	Expert and agent.....	16	93 00	29 21
J. J. Sorogan.....	Expert and agent.....	16	100 00	50 51
George B. Taylor.....	Expert and agent.....	16	80 00	44 94
M. P. Toomey.....	Expert and agent.....	16	81 00	42 87
M. P. Toomey.....	Expert and agent.....	16	78 00	26 95
Robert C. Turner.....	Expert and agent.....	16	100 00	15 42
James W. Walsh.....	Expert and agent.....	16	80 00	63 17
R. D. Clark.....	Chemist.....	16	50 00	20 35
Joseph F. Geisler.....	Chemist.....	16	28 75	.....
Samuel A. Lattimore.....	Chemist.....	16	100 00	.....

DETAILED STATEMENT — (Continued).

PAYEE.	Position held.	Date of check.	Compensation.	Expenses.
W. E. McDuffie	Chemist	November 16	\$100 00	\$11 40
Wm. Manlius Smith	Chemist	" 16	35 00	2 52
F. P. Vandenberg	Chemist	" 16	100 00	.....
Lewis Cass.	Counsel	" 16	25 00	.....
Risley & Perry	Counsel	" 16	210 00	26 10
The Argus Co.	Printing	" 16	.....	160 50
Charles Van Loon	Laborer	" 16	30 00	.....
P. J. Sutley	Assistant commissioner	" 16	166 67	47 81
Grove Barnum	Expert and agent	" 16	80 00	37 04
Chas. J. Morganstern	Expert and agent	" 16	80 00	40 77
O. P. Stockwell	Attorney	" 16	.....	21 24
Peter H. Parker	Attorney	" 23	.....	11 95
Peter H. Parker	Attorney	" 23	100 00	87 10
F. D. Tuthill	Assistant commissioner	" 23	150 00	23 95
John E. Cady	Expert and agent	" 23	75 00	103 22
Robert Dalzell	Expert and agent	" 23	87 00	87 15
Wm B. Howard	Expert and agent	" 23	75 00	64 54
H. A. Rees	Expert and agent	" 23	81 00	67 74
Charles Sears	Expert and agent	" 23	80 00	78 42
E. S. Wilson	Expert and agent	" 23	100 00	59 93
W. S. Daly	Chemist	" 23	75 00	.....
F. E. Englehardt	Chemist	" 23	12 00	10
T. C. DuBois	Expert and agent	" 23	100 00	76 90
Lewis Cass	Counsel	" 25	50 00	5 04
Simon Nussbaum	Expert and agent	" 27	100 00	21 95
Josiah K. Brown	Dairy commissioner	December 1	250 00	.....

Geo. L. Flanders.....	Assistant commissioner.....	“	1	166 66	.....
Geo. B. Fellows	Expert and agent.....	“	1	100 00	.....
R. D. Clark.....	Chemist.....	“	1	166 66	.....
John M. Hutchings.....	Stenographer	“	1	40 00	3 89
Geo. L. Flanders	Assistant commissioner.....	“	3	.....	141 50
James H. Brown	Assistant commissioner.....	“	11	100 00	39 63
J. W. McMahon.....	Assistant commissioner.....	“	11	166 66	36 29
P. J. Sutley.....	Assistant commissioner.....	“	11	166 67	41 05
F. D. Tuthill.....	Assistant commissioner.....	“	11	150 00	20 45
B. F. Van Valkenburgh	Assistant commissioner.....	“	11	208 33	106 63
Geo. J. Zillig.....	Assistant commissioner.....	“	11	166 67	18 39
Samuel Abrams.....	Expert and agent.....	“	11	100 00	17 28
Grove Barnum	Expert and agent.....	“	11	80 00	21 66
Geo. Bernhard.....	Expert and agent.....	“	11	100 00	15 58
Charles Burke.....	Expert and agent.....	“	11	100 00	42 75
Thomas Byrnes.....	Expert and agent.....	“	11	70 18	88 87
John E. Cady	Expert and agent.....	“	11	75 00	81 21
Arch D. Clark	Expert and agent.....	“	11	100 00	45 01
Walter J. Corbett	Expert and agent.....	“	11	80 00	6 65
John J. Coughlin	Expert and agent.....	“	11	100 00	8 15
Robert Dalzell.....	Expert and agent.....	“	11	30 00	24 35
A. S. Delano	Expert and agent.....	“	11	100 00	36 97
T. C. Du Bois.....	Expert and agent.....	“	11	100 00	37 88
Michael Galligan	Expert and agent.....	“	11	75 00	16 52
Frank E. Geise.....	Expert and agent.....	“	11	90 00	14 71
Thomas R. Gray.....	Expert and agent.....	“	11	100 00	47 00
O. C. Griffiths.....	Expert and agent.....	“	11	80 00	68 35
W. W. Hall.....	Cheese instructor	“	11	110 00	54 82
W. B. Howard	Expert and agent.....	“	11	75 00	13 35
Chas. S. Kellogg.....	Expert and agent.....	“	11	69 00	56 96
W. W. Meeteer	Expert and agent.....	“	11	100 00	51 37

DETAILED STATEMENT — (Continued).

PAYEE.	Position held.	Date of check.	Compensation.	Expenses.
M. T. Morgan.....	Cheese instructor.....	December 11	\$120 00	\$63 39
Chas. J. Morganstern	Expert and agent.....	" 11	80 00	22 52
R. H. Palmer	Expert and agent.....	" 11	80 00	21 00
Marcus A. Perry	Expert and agent.....	" 11	100 00	15 39
Joseph M. Quigley.....	Expert and agent.....	" 11	100 00	12 99
H. A. Rees.....	Expert and agent.....	" 11	33 00	19 54
Hoffman Ruger	Expert and agent.....	" 11	75 00	15 10
L. E. Scrafford	Expert and agent.....	" 11	75 00	31 55
Chas. Sears	Expert and agent.....	" 11	80 00	58 65
Geo. A. Smith.....	Cheese instructor	" 11	150 00	52 10
J. J. Sorogan.....	Expert and agent.....	" 11	100 00	42 10
Geo. B. Taylor	Expert and agent.....	" 11	75 00	16 30
M. P. Toomey.....	Expert and agent.....	" 11	75 00	35 57
Robert C. Turner.....	Expert and agent.....	" 11	100 00	15 92
E. S. Wilson	Expert and agent.....	" 11	100 00	45 65
R. D. Clark.....	Chemist	" 11	50 00	5 01
Joseph F. Geisler	Chemist	" 11	33 50	1 50
Joseph F. Giesler	Chemist	" 11	8 00	13
Samuel A. Lattimore.....	Chemist	" 11	100 00	.....
W. E. McDuffie	Chemist.....	" 11	100 00	20 80
Stillwell & Gladding	Chemists.....	" 11	13 75	1 25
F. P. Vandenbergh	Chemist	" 11	100 00	.....
Frederick W. Clark	Counsel	" 11	40 00	.....
John F. Graham	Counsel	" 11	10 00	.....
T. M. Griffing	Counsel	" 11	72 00	4 15
Wm. P. Quinn.....	Counsel	" 11	720 00	24 80

O. P. Stockwell	Counsel	11	25 00	9 60
Peter H. Parker	Assistant commissioner	11	100 00	65 02
L. G. Cameron	Typewriter	11	20 00	.....
Chas. Van Loon	Laborer	11	30 00	.....
Josiah K. Brown	Dairy commissioner	23	250 00	.....
George L. Flanders	Assistant commissioner	23	166 68	.....
George B. Fellows	Expert and agent	23	100 00	.....
R. D. Clark	Chemist	23	166 66	.....
Simon Nussbaum	Expert and agent	23	100 00	12 56
John H. Foley	Assistant commissioner	23	150 00	16 00
Wm. T. Peaslee	Expert and agent	23	80 00	36 53
W. G. Spence	Expert and agent	23	90 00	24 73
James W. Walsh	Expert and agent	23	80 00	46 30
E. G. Love	Chemist	23	5 00	.....
D. B. Comstock	Chemist	23	5 00	90
George W. Price	Expert and agent	23	80 00	43 55
Comptroller	Stationery	23	.....	165 62
P. J. Sutley	Assistant commissioner	2	166 67	43 84
George L. Flanders	Assistant commissioner	7	.....	172 07
Josiah K. Brown	Dairy commissioner	11	.....	53 75
James H. Brown	Assistant commissioner	11	100 00	44 09
John H. Foley	Assistant commissioner	11	150 00	9 24
B. F. Van Valkenburgh	Assistant commissioner	11	208 33	66 70
Geo. J. Zillig	Assistant commissioner	11	166 66	21 39
Samuel Abrams	Expert and agent	11	100 00	1 75
Grove Barnum	Expert and agent	11	80 00	14 84
George Bernhard	Expert and agent	11	100 00	10 84
Charles Burke	Expert and agent	11	100 00	30 41
John E. Cady	Expert and agent	11	75 00	50 37
Arch D. Clark	Expert and agent	11	100 00	56 65
John J. Coughlin	Expert and agent	11	100 00	13 62

1892.
January

PAYEE.	Position held.	Date of check.	Compensa- tion.	Expenses.
James H. Brown.....	Assistant commissioner.....	1891. October 8	\$100 00	\$43 21
George L. Flanders.....	Assistant commissioner.....	" 8	.....	103 42
J. W. McMahon.....	Assistant commissioner.....	" 8	166 66	39 84
Peter H. Parker.....	Assistant commissioner.....	" 8	100 00	79 45
Patrick J. Sutley.....	Assistant commissioner.....	" 8	166 67	55 80
F. D. Tuthill.....	Assistant commissioner.....	" 8	150 00	35 58
B. F. Van Valkenburgh.....	Assistant commissioner.....	" 8	208 33	27 79
Geo. J. Zillig.....	Assistant commissioner.....	" 8	166 66	18 07
Samuel Abrams.....	Expert and agent.....	" 8	100 00	16 58
Grove Barnum.....	Expert and agent.....	" 8	80 00	22 45
Charles Burke.....	Expert and agent.....	" 8	80 00	67 30
Thomas Byrnes.....	Expert and agent.....	" 8	65 34	66 20
John E. Cady.....	Expert and agent.....	" 8	75 00	107 71
A. D. Clark.....	Expert and agent.....	" 8	100 00	70 26
John J. Coughlin.....	Expert and agent.....	" 8	100 00	13 31
Robert Dalzell.....	Expert and agent.....	" 8	84 00	80 60
A. S. Delano.....	Expert and agent.....	" 8	100 00	36 69
T. C. DuBois.....	Expert and agent.....	" 8	100 00	67 73
Frank E. Geise.....	Expert and agent.....	" 8	90 00	9 47
Michael Galligan.....	Expert and agent.....	" 8	75 00	18 70
T. R. Gray.....	Expert and agent.....	" 8	100 00	70 45
O. C. Griffis.....	Expert and agent.....	" 8	80 00	88 60
W. W. Hall.....	Cheese instructor.....	" 8	130 00	80 13

Stillwell & Gladding.....	Chemists	11	93 87	8 50
F. P. Vandenberg.....	Chemist	11	100 00	.....
J. M. Hutchings.....	Stenographer	11	40 00	.....
Charles Van Loon.....	Laborer	11	30 00	.....
Peter H. Parker.....	Assistant commissioner	18	100 00	56 82
David Barry.....	Expert	18	78 00	3 40
W. J. Corbett.....	Expert	18	80 00	8 26
T. C. Du Bois.....	Expert	18	100 00	59 68
W. B. Howard.....	Expert	18	56 25	12 65
Charles S. Kellogg.....	Expert	18	81 00	80 43
R. H. Palmer.....	Expert	18	80 00	35 30
William T. Peaslee.....	Expert	18	80 00	21 20
Hoffman Ruger.....	Expert	18	75 00	9 70
George B. Taylor.....	Expert	18	75 00	9 50
James W. Walsh.....	Expert	18	80 00	45 94
Wm. Manlius Smith.....	Chemist	18	12 00	50
Stillwell & Gladding.....	Chemists	18	25 00	3 42
W. G. Spence.....	Expert and agent	19	63 00	27 24
Simon Nussbaum.....	Expert and agent	29	100 00	5 75
James W. McMahon.....	Assistant commissioner	29	166 66	.....
Josiah K. Brown.....	Dairy commissioner	1	250 00	.....
George L. Flanders.....	Assistant commissioner	1	166 66	.....
George B. Fellows.....	Expert and agent	1	100 00	.....
R. D. Clark.....	Chemist	1	166 66	.....
George L. Flanders.....	Assistant commissioner	13	.....	122 02
James H. Brown.....	Assistant commissioner	15	100 00	17 84
John H. Foley.....	Assistant commissioner	15	150 00	13 56
Patrick J. Sutley.....	Assistant commissioner	15	166 67	30 32
F. D. Tuthill.....	Assistant commissioner	15	150 00	37 93
B. F. Van Valkenburgh.....	Assistant commissioner	15	208 33	36 12
James W. McMahon.....	Assistant commissioner	15	166 66	53 98

DETAILED STATEMENT — (Continued).

PAYEE.	Position held.	Date of check.	Compensation.	Expenses.
George J. Zillig.....	Assistant commissioner.....	February 15	\$166 67	\$26 99
Samuel Abrams.....	Expert and agent.....	" 15	100 00	10 79
Grove Barnum.....	Expert and agent.....	" 15	80 00	9 94
Charles Burke.....	Expert and agent.....	" 15	100 00	15 64
John E. Cady.....	Expert and agent.....	" 15	75 00	62 66
Arch D. Clark.....	Expert and agent.....	" 15	100 00	86 65
John J. Coughlin.....	Expert and agent.....	" 15	100 00	7 80
A. S. Delano.....	Expert and agent.....	" 15	100 00	21 54
Michael Galligan.....	Expert and agent.....	" 15	75 00	10 20
Frank E. Geise.....	Expert and agent.....	" 15	90 00	8 55
T. R. Gray.....	Expert and agent.....	" 15	100 00	65 75
O. C. Griffiths.....	Expert and agent.....	" 15	80 00	50 57
W. W. Hall.....	Cheese instructor.....	" 15	48 00	44 14
W. B. Howard.....	Expert and agent.....	" 15	37 50	8 70
Chas. S. Kellogg.....	Expert and agent.....	" 15	78 00	54 77
Wm. W. Meeteer.....	Expert and agent.....	" 15	100 00	87 55
M. T. Morgan.....	Cheese instructor.....	" 15	60 00	35 51
James W. Walsh.....	Expert and agent.....	" 15	80 00	39 23
C. J. Morganstern.....	Expert and agent.....	" 15	80 00	13 05
Wm. T. Peaslee.....	Expert and agent.....	" 15	80 00	18 02
R. H. Palmer.....	Expert and agent.....	" 15	80 00	57 18
Geo. W. Price.....	Expert and agent.....	" 15	80 00	58 79
Joseph M. Quigley.....	Expert and agent.....	" 15	100 00	7 50
H. A. Rees.....	Expert and agent.....	" 15	27 00	5 30
Hoffman Ruger.....	Expert and agent.....	" 15	75 00	11 61

L. E. Scafford	Expert and agent.....	15	75 00	7 90
Charles Sears.....	Expert and agent.....	15	80 00	66 56
Geo. A. Smith.....	Cheese in-structor.....	15	150 00	35 71
Robert C. Turner.....	Expert and agent.....	15	50 00	11 27
E. S. Wilson.....	Expert and agent.....	15	100 00	43 55
Josiah K. Brown	Dairy commissioner.....	15	.....	16 30
Geo. W. Cavanaugh.....	Counsel	15	7 50	50
Theodore Deecke	Chemist	15	35 00	13 80
Joseph F. Geisler.....	Chemist	15	212 25	2 16
E. G. Love.....	Chemist	15	45 00	75
Stillwell & Gladding.....	Chemists	15	161 87	2 50
Calkins & Forsyth.....	Counsel	15	320 00	10 34
Arthur C. Salmon.....	Counsel	15	85 00	.....
Armstrong & Witcher	Counsel	15	60 00	.....
J. M. Hutchings.....	Stenographer.....	15	40 00	.....
D. H. Turner	Expert and agent.....	15	25 00	.....
James E. Ryan.....	Expert and agent.....	15	30 00	9 04
Charles Van Loon	Laborer	15	30 00	.....
Geo. Bernhard.....	Expert and agent.....	15	100 00	8 06
Samuel A. Lattimore.....	Chemist	15	100 00	.....
Marcus A. Perry.....	Expert and agent.....	15	100 00	12 02
Peter H. Parker.....	Assistant commissioner.....	15	100 00	67 61
F. D. Tuthill.....	Assistant commissioner.....	15	150 00	28 08
Wm. E. McDuffie.....	Chemist	15	200 00	20 72
Charles D. Olendorf.....	Counsel	15	150 00	.....
David Barry	Expert and agent.....	15	60 00	10 65
T. C. Du Bois.....	Expert and agent.....	15	100 00	31 26
J. J. Sorogan	Expert and agent.....	15	100 00	.....
Geo. B. Taylor	Expert and agent.....	15	75 00	12 35
M. P. Toomey.....	Expert and agent.....	15	78 00	15 28
William G. Spence	Expert and agent.....	25	24 00	4 87

DETAILED STATEMENT — (Continued).

PAYEE.	Position held.	Date of check.	Compensation.	Expenses.
New York Stencil Works.....	.....	February 25	.....	\$35 00
W. J. Corbett.....	Expert and agent.....	" 25	\$80 00	11 40
J. K. Brown	Dairy commissioner.....	" 26	250 00	.....
Geo. L. Flanders.. ..	Assistant commissioner.....	March 1	166 66	.....
Geo. B. Fellows	Expert and agent.....	" 1	100 00	.....
R. D. Clark.....	Chemist.....	" 1	166 66	.....
Simon Nussbaum	Expert and agent.....	" 1	100 00	9 33
J. M. Hutchings.....	Stenographer	" 1	40 00	.....
Charles Burke.....	Expert and agent	" 1	100 00	47 17
Charles Van Loon	Laborer.....	" 1	35 76	.....
J. H. Brown.....	Assistant commissioner.....	" 9	100 00	3 16
F. P. Vandenbergh.....	Chemist	" 9	150 00	6 00
Geo. L. Flanders.....	Assistant commissioner.....	" 9	.....	63 14
James W. McMahon	Assistant commissioner.....	" 15	166 66	42 15
Peter H. Parker	Assistant commissioner.....	" 15	100 00	44 64
Patrick J. Sutley	Assistant commissioner.....	" 15	166 67	18 49
F. D. Tuthill.....	Assistant commissioner.....	" 15	150 00	14 90
B. F. Van Valkenburgh	Assistant commissioner.....	" 15	208 33	67 17
Geo. J. Zillig.....	Assistant commissioner.....	" 15	166 66	16 05
Samuel Abrams	Expert and agent.....	" 15	100 00	11 19
Josiah K. Brown	Dairy commissioner.....	" 15	.....	21 45
Grove Barnum	Expert and agent.....	" 15	80 00	5 07
Thomas Byrnes.....	Expert and agent.....	" 15	43 88	38 68
W. J. Corbett.....	Expert and agent.....	" 15	80 00	5 36
Arch D. Clark.....	Expert and agent.....	" 15	100 00	83 10

John J. Coughlin	Expert and agent.....	"	15	100 00	10 17
A. S. Delano	Expert and agent.....	"	15	100 00	24 42
T. C. Du Bois.....	Expert and agent.....	"	15	100 00	45 80
Michael Galligan.....	Expert and agent.....	"	15	75 00	13 50
Frank E. Geise.....	Expert and agent.....	"	15	90 00	14 72
O. C. Griffiths.....	Expert and agent.....	"	15	80 00	55 20
W. W. Hall.....	Cheese instructor.....	"	15	48 00	45 79
Charles S. Kellogg	Expert and agent.....	"	15	69 00	60 32
Chas. J. Morganstern.....	Expert and agent.....	"	15	80 00	16 02
E. S. Wilson	Expert and agent.....	"	15	100 00	45 70
James W. Walsh	Expert and agent.....	"	15	80 00	34 50
M. T. Morgan.....	Cheese instructor.....	"	15	60 00	40 59
Wm. W. Meeteer.....	Expert and agent.....	"	15	100 00	81 00
R. H. Palmer	Expert and agent.....	"	15	80 00	37 14
Geo. W. Price.....	Expert and agent.....	"	15	80 00	52 93
Hoffman Ruger	Expert and agent.....	"	15	75 00	13 60
Geo. A. Smith.....	Cheese instructor.....	"	15	100 00	.....
Joseph F. Geisler	Chemist	"	15	150 00	1 00
E. G. Love.....	Chemist	"	15	96 25	1 50
W. E. McDuffie	Chemist	"	15	100 00	2 78
John A. Miller	Chemist	"	15	100 00	.....
Stillwell & Gladding	Chemists.....	"	15	78 12	75
J. M. Coman.....	Counsel	"	15	80 00	.....
Francis V. S. Oliver.....	Counsel	"	15	60 00	.....
O. P. Stockwell.....	Counsel	"	15	25 00	3 11
John H. Foley	Assistant commissioner.....	"	21	150 00	6 64
George Bernhard	Expert and agent.....	"	21	100 00	15 09
John E. Cady	Expert and agent.....	"	21	75 00	63 85
W. B. Howard	Expert and agent.....	"	21	37 50	7 70
Marcus A. Perry	Expert and agent.....	"	21	100 00	22 24
Joseph M. Quigley.....	Expert and agent.....	"	21	100 00	15 13

DETAILED STATEMENT — (Continued).

PAYEE.	Position held.	Date of check.	Compensation.	Expenses.
H. A. Rees.....	Expert and agent.....	March 21	\$36 00	.....
L. E. Scrafford	Expert and agent.....	" 21	75 00	\$5 68
Samuel A. Lattimore.....	Chemist	" 21	100 00	.....
F. E. Englehardt.....	Chemist	" 21	6 00	20
William Manlius Smith.....	Chemist	" 21	15 00	5 42
C. D. Olendorf	Counsel	" 21	230 00	.....
James Dougherty.....	Counsel	" 21	40 00	8 16
Joseph J. Marrin	Counsel	" 21	290 00	.....
Lewis Cass.....	Counsel	" 21	50 00	.....
Simon Nussbaum	Expert and agent.....	" 31	100 00	16 35
J. M. Hutchings.....	Stenographer	" 31	40 00	.....
J. K. Brown	Dairy commissioner.....	April 1	250 00	.....
Geo. L. Flanders.....	Assistant commissioner.....	" 1	166 68	.....
Geo. B. Fellows	Expert and agent.....	" 1	100 00	.....
R. D. Clark.. ..	Chemist	" 1	166 68	.....
Geo. L. Flanders.....	Assistant commissioner.....	" 8	.....	151 91
J. K. Brown	Dairy commissioner.....	" 8	.....	20 05
J. W. McMahon.....	Assistant commissioner.....	" 8	166 66	.....
Patrick J. Sutley	Assistant commissioner.....	" 8	166 67	.....
F. D. Tuthill.....	Assistant commissioner.....	" 8	150 00	29 94
B. F. Van Valkenburgh	Assistant commissioner.....	" 8	208 00	71 57
Samuel Abrams.....	Expert and agent.....	" 8	100 00	6 43
Grove Barnum	Expert and agent.....	" 8	80 00	14 87
Arch D. Clark	Expert and agent.....	" 8	100 00	54 35
John J. Coughlin.....	Expert and agent.....	" 8	100 00	13 35

A. S. Delano	Expert and agent.....	8	100 00	21 57
Michael Galligan.....	Expert and agent.....	8	75 00	18 70
Frank E. Geise	Expert and agent.....	8	90 00	13 43
Geo. S. Hutchinson.....	Expert and agent.....	8	3 00	1 96
W. W. Hall	Cheese instructor	8	57 00	47 24
Wm. W. Meeteer.....	Expert and agent.....	8	100 00	54 80
Wm. Mink.....	Laborer	8	24 20	.....
John R. Horton	Expert and agent.....	8	53 33	15 85
R. H. Palmer.....	Expert and agent.....	8	80 00	66 14
Geo. W. Price.....	Expert and agent.....	8	80 00	52 79
Hoffman Ruger	Expert and agent.....	8	75 00	14 34
George A. Smith.....	Cheese instructor.....	8	100 00	.....
James W. Walsh	Expert and agent.....	8	80 00	25 91
R. D. Clark.....	Chemist	8	.....	4 71
Joseph F. Geisler.....	Chemist	8	27 60	15
E. G. Love.....	Chemist	8	10 00	.....
John A. Miller	Chemist	8	100 00	.....
Stillwell & Gladding	Chemists	8	76 87	1 50
William Armstrong.....	Counsel	8	60 00	.....
Lewis Cass.....	Counsel	8	50 00	.....
John M. Coman	Counsel	8	150 00	.....
F. V. S. Oliver	Counsel	8	30 00	.....
Charles Burke.....	Expert and agent.....	8	100 00	35 46
James H. Brown.....	Assistant commissioner.....	15	125 00	37 53
John H. Foley	Assistant commissioner.....	15	150 00	7 60
Peter H. Parker.....	Assistant commissioner.....	15	100 00	50 01
George J. Zillig	Assistant commissioner.....	15	166 67	22 38
Geo. Bernhard.....	Expert and agent.....	15	100 00	14 07
W. J. Corbett.....	Expert and agent.....	15	80 00	6 70
O. C. Griffis.....	Expert and agent.....	15	80 00	59 45
John E. Cady	Expert and agent.....	15	75 00	77 81

F. D. Tuthill.....	Commissioner	10	150 00	21 75
B. F. Van Valkenburgh	Commissioner.	10	208 33	23 46
Samuel Abrams	Expert and agent.....	10	100 00	15 61
Grove Barnum	Expert and agent.....	10	80 00	15 64
John E. Cady	Expert and agent.....	10	75 00	74 03
Arch D. Clark	Expert and agent.....	10	100 00	51 80
John J. Coughlin.....	Expert and agent.....	10	100 00	8 56
A. S. Delano	Expert and agent.....	10	100 00	16 06
Michael Galligan.....	Expert and agent.....	10	75 00	17 13
Frank E. Geise.....	Expert and agent.....	10	90 00	12 60
O. C. Griffis.....	Expert and agent.....	10	80 00	53 59
W. W. Hall.....	Cheese instructor	10	110 00	42 79
John McGuire.....	Expert and agent.....	10	100 00	43 50
Chas. J. Morganstern.....	Expert and agent.....	10	80 00	23 02
Henry D. Myers.....	Laborer	10	30 00	.....
New York Stencil Works	Stencil plates.....	10	35 00	.....
John T. Norton.....	Expert and agent.....	10	100 00	43 10
Geo. W. Price.....	Expert and agent.....	10	80 00	52 00
H. A. Rees.....	Expert and agent.....	10	45 00	15 25
Hoffman Ruger.....	Expert and agent.....	10	75 00	14 40
L. E. Scrafford	Expert and agent.....	10	75 00	4 76
Geo. A. Smith.....	Cheese instructor.....	10	75 00	30 66
James W. Walsh	Expert and agent.....	10	80 00	34 43
E. S. Wilson	Expert and agent.....	10	100 00	42 65
Wm. Armstrong.....	Counsel	10	90 00	.....
John M. Coman.....	Counsel	10	40 00	.....
R. D. Clark.....	Chemist	10	.....	7 84
E. G. Love.....	Chemist	10	59 00	.....
John A. Miller	Chemist	10	100 00	.....
Stillwell & Gladding	Chemists	10	75 00	5 62
William Manlius Smith.....	Chemist	11	15 00	20

DETAILED STATEMENT — (Continued).

PAYEE.	Position held.	Date of check.	Compensation.	Expenses.
John H. Foley.....	Assistant commissioner.....	May 17	\$150 00	\$3 84
James W. McMahon.....	Assistant commissioner.....	" 17	166 66	73 08
Geo. J. Zillig.....	Assistant commissioner.....	" 17	166 66	17 87
Geo. Bernhard.....	Expert and agent.....	" 17	100 00	10 32
Chas. S. Kellogg.....	Expert and agent.....	" 17	78 00	65 58
M. T. Morgan.....	Cheese instructor.....	" 17	75 00	49 37
M. A. Perry.....	Expert and agent.....	" 17	100 00	11 10
Joseph M. Quigley.....	Expert and agent.....	" 17	100 00	10 18
Wm. G. Spence.....	Expert and agent.....	" 17	24 00	6 16
Robert C. Turner.....	Expert and agent.....	" 17	100 00	22 58
Theodore Deecke.....	Chemist.....	" 17	20 00	.....
Joseph F. Geisler.....	Chemist.....	" 17	95 50	.....
W. E. McDuffie.....	Chemist.....	" 17	100 00	.....
Samuel A. Lattimore.....	Chemist.....	" 17	107 50	.....
Wm. Manlius Smith.....	Chemist.....	" 17	12 00	10
R. H. Palmer.....	Expert and agent.....	" 20	80 00	51 23
W. J. Corbett.....	Expert and agent.....	" 24	80 00	6 61
Robert Dalzell.....	Expert and agent.....	" 24	15 00	12 50
W. B. Howard.....	Expert and agent.....	" 24	37 50	5 85
New York Stencil Works.....	Stencil plates.....	" 24	35 00	.....
J. J. Sorogan.....	Expert and agent.....	" 24	15 00	6 00
Wm. W. Meeteer.....	Expert and agent.....	" 24	100 00	54 10
Simon Nussbaum.....	Expert and agent.....	" 27	100 00	3 90
J. M. Hutchings.....	Stenographer.....	" 27	40 00	1 43
Geo. B. Fellows.....	Expert and agent.....	" 27	.....	9 68
Josiah K. Brown.....	Dairy commissioner.....	June 1	250 00	.....

Geo. L. Flanders.....	Assistant commissioner.....	“	1	186 66	.....
Geo. B. Fellows.....	Expert and agent.....	“	1	100 00	.....
R. D. Clark.....	Chemist.....	“	1	166 66	.....
Lewis Cass.....	Counsel.....	“	3	100 00	8 15
Geo. L. Flanders.....	Assistant commissioner.....	“	8	.....	126 35
J. H. Brown.....	Assistant commissioner.....	“	9	125 00	21 06
John H. Foley.....	Assistant commissioner.....	“	9	150 00	4 80
James W. McMahon.....	Assistant commissioner.....	“	9	166 66	42 06
Peter H. Parker.....	Assistant commissioner.....	“	9	100 00	53 43
Patrick J. Sutley.....	Assistant commissioner.....	“	9	166 67	34 53
F. D. Tuthill.....	Assistant commissioner.....	“	9	150 00	16 60
B. F. Van Valkenburgh.....	Assistant commissioner.....	“	9	208 33	31 52
Geo. J. Zillig.....	Assistant commissioner.....	“	9	166 66	23 60
Samuel Abrams.....	Expert and agent.....	“	9	100 00	14 37
Grove Barnum.....	Expert and agent.....	“	9	80 00	28 20
Charles Burke.....	Expert and agent.....	“	9	100 00	41 03
John E. Cady.....	Expert and agent.....	“	9	75 00	71 99
Arch D. Clark.....	Expert and agent.....	“	9	100 00	40 20
W. J. Corbett.....	Expert and agent.....	“	9	80 00	7 47
John J. Coughlin.....	Expert and agent.....	“	9	100 00	10 59
A. S. Delano.....	Expert and agent.....	“	9	100 00	27 97
Michael Galligan.....	Expert and agent.....	“	9	75 00	19 03
Frank E. Geise.....	Expert and agent.....	“	9	90 00	11 20
W. W. Hall.....	Cheese instructor.....	“	9	130 00	78 21
John McGuire.....	Expert and agent.....	“	9	100 00	48 70
Wm. W. Meeteer.....	Expert and agent.....	“	9	100 00	47 05
M. T. Morgan.....	Cheese instructor.....	“	9	130 00	61 90
Charles J. Morganstern.....	Expert and agent.....	“	9	80 00	31 33
John T. Norton.....	Expert and agent.....	“	9	100 00	38 86
R. H. Palmer.....	Expert and agent.....	“	9	80 00	34 50
M. A. Perry.....	Expert and agent.....	“	9	100 00	18 80

DETAILED STATEMENT — (Continued).

PAYEE.	Position held.	Date of check.	Compensation.	Expenses.
New York Stencil Works.....	.....	February 25	.....	\$35 00
W. J. Corbett.....	Expert and agent.....	" 25	\$80 00	11 40
J. K. Brown	Dairy commissioner.....	" 26	250 00	.....
Geo. L. Flanders.. ..	Assistant commissioner.....	March 1	166 66	.....
Geo. B. Fellows	Expert and agent.....	" 1	100 00	.....
R. D. Clark.....	Chemist.....	" 1	166 66	.....
Simon Nussbaum	Expert and agent.....	" 1	100 00	9 33
J. M. Hutchings.....	Stenographer	" 1	40 00	.....
Charles Burke.....	Expert and agent	" 1	100 00	47 17
Charles Van Loon	Laborer.....	" 1	35 76	.....
J. H. Brown.....	Assistant commissioner.....	" 9	100 00	3 16
F. P. Vandenbergh.....	Chemist	" 9	150 00	6 00
Geo. L. Flanders.....	Assistant commissioner.....	" 9	.....	63 14
James W. McMahon	Assistant commissioner.....	" 15	166 66	42 15
Peter H. Parker	Assistant commissioner.....	" 15	100 00	44 64
Patrick J. Sutley	Assistant commissioner.....	" 15	166 67	18 49
F. D. Tuthill.....	Assistant commissioner.....	" 15	150 00	14 90
B. F. Van Valkenburgh	Assistant commissioner.....	" 15	208 33	67 17
Geo. J. Zillig.....	Assistant commissioner.....	" 15	166 66	16 05
Samuel Abrams	Expert and agent.....	" 15	100 00	11 19
Josiah K. Brown	Dairy commissioner.....	" 15	.....	21 45
Grove Barnum	Expert and agent.....	" 15	80 00	5 07
Thomas Byrnes.....	Expert and agent.....	" 15	43 88	38 68
W. J. Corbett.....	Expert and agent.....	" 15	80 00	5 36
Arch D. Clark.....	Expert and agent.....	" 15	100 00	83 10

George Bernhard	Expert and agent	“	22	100 00	12 67
O. C. Griffis	Expert and agent	“	22	80 00	38 65
G. S. Hutchinson	Expert and agent	“	22	3 00	4 74
W. B. Howard	Expert and agent	“	22	37 50	19 41
Charles S. Kellogg	Expert and agent	“	22	78 00	53 06
L. E. Scrafford	Expert and agent	“	22	75 00	13 92
Maurice Perkins	Expert and agent	“	22	15 00	.....
J. K. Brown	Dairy commissioner	July	1	250 00	.....
George L. Flanders	Assistant commissioner	“	1	166 68	.....
George B. Fellows	Expert and agent	“	1	100 00	.....
R. D. Clark	Chemist	“	1	166 68	.....
Charles Burke	Expert and agent	“	1	100 00	61 65
George B. Fellows	Expert and agent	“	1	.....	13 19
Simon Nussbaum	Expert and agent	“	1	100 00	.....
John M. Hutchings	Stenographer	“	1	40 00	.....
J. K. Brown	Dairy commissioner	“	11	.....	26 20
J. H. Brown	Assistant commissioner	“	11	150 00	16 42
James W. McMahon	Assistant commissioner	“	11	166 66	60 45
Peter H. Parker	Assistant commissioner	“	11	100 00	58 49
Patrick J. Sutley	Assistant commissioner	“	11	166 67	36 46
B. F. Van Valkenburgh	Assistant commissioner	“	11	208 33	31 86
George J. Zillig	Assistant commissioner	“	11	166 66	18 32
Samuel Abrams	Expert and agent	“	11	100 00	15 96
Grove Barnum	Expert and agent	“	11	80 00	19 15
John E. Cady	Expert and agent	“	11	75 00	79 96
Arch D. Clark	Expert and agent	“	11	100 00	63 50
John J. Coughlin	Expert and agent	“	11	100 00	15 25
Robert Dalzell	Expert and agent	“	11	81 00	64 85
A. S. Delano	Expert and agent	“	11	100 00	17 55
Michael Galligan	Expert and agent	“	11	75 00	16 78
Frank E. Geise	Expert and agent	“	11	90 00	12 51

DETAILED STATEMENT — (Continued).

PAYEE.	Position held.	Date of check.	Compensa- tion.	Expenses.
W. W. Hall.....	Cheese instructor.....	July 11	\$150 00	\$65 40
W. B. Howard.....	Expert and agent	" 11	75 00	21 83
W. W. Meeteer.....	Expert and agent	" 11	100 00	64 95
M. T. Morgan	Cheese instructor.....	" 11	130 00	68 67
Charles J. Morganstern	Expert and agent	" 11	80 00	20 81
John T. Norton.....	Expert and agent	" 11	100 00	36 30
H. A. Rees.....	Expert and agent	" 11	78 00	46 09
Hoffman Ruger.....	Expert and agent	" 11	75 00	9 56
L. B. Scrafford.....	Expert and agent	" 11	100 00	17 30
George A. Smith.....	Cheese instructor.....	" 11	150 00	48 35
W. G. Spence.....	Expert and agent	" 11	91 00	34 40
Robert C. Turner	Expert and agent	" 11	100 00	11 98
E. S. Wilson	Expert and agent	" 11	100 00	40 00
R. D. Clark	Chemist.....	" 11	.....	18 16
John A. Miller.....	Chemist.....	" 11	100 00	.....
William Armstrong	Counsel	" 11	60 00	.....
Joseph J. Marrin.....	Counsel	" 11	30 00	.....
Henry J. McCormick	Counsel	" 11	25 00	46
Henry D. Myers	Laborer	" 11	30 00	.....
George L. Flanders.....	Assistant commissioner.....	" 22	.....	21 94
John H. Foley.....	Assistant commissioner.....	" 22	150 00	4 80
F. D. Tuthill.....	Assistant commissioner.....	" 22	150 00	17 10
George Bernhard.....	Expert and agent	" 22	100 00	10 44
W. J. Corbett	Expert and agent	" 22	80 00	12 62
Charles S. Kellogg	Expert and agent	" 22	60 00	44 84
John McGuire	Expert and agent	" 22	100 00	42 96

D. P. McMahon	Expert and agent	22	48 00	13 85
R. H. Palmer	Expert and agent	22	80 00	57 11
Marcus A. Perry	Expert and agent	22	100 00	17 78
George W. Price	Expert and agent	22	80 00	67 30
Joseph M. Quigley	Expert and agent	22	100 00	8 82
James E. Ryan	Expert and agent	22	10 00	2 98
J. J. Sorogan	Expert and agent	22	100 00	70 79
James W. Walsh	Expert and agent	22	80 00	41 48
Joseph F. Geisler	Chemist	22	67 13	60
Samuel A. Lattimore	Chemist	22	100 00	
W. E. McDuffie	Chemist	22	100 00	
Wm. Manlius Smith	Chemist	22	6 00	20
Stillwell & Gladding	Chemists	22	66 61	
Lewis Cass	Counsel	22	75 00	
Charles D. Olendorf	Counsel	22	120 00	
Charles Burke	Expert and agent	28	100 00	40 67
George B. Fellows	Expert and agent	28		9 45
Simon Nussbaum	Expert and agent	28	100 00	11 85
J. M. Hutchings	Stenographer	28	40 00	
George B. Fellows	Expert and agent	28	100 00	
J. K. Brown	Dairy commissioner	1	250 00	
Geo. L. Flanders	Assistant commissioner	1	166 66	
R. D. Clark	Chemist	1	166 66	
Geo. L. Flanders	Assistant commissioner	15		167 55
James H. Brown	Assistant commissioner	18	150 00	24 37
John H. Foley	Assistant commissioner	18	150 00	6 70
James W. McMahon	Assistant commissioner	18	166 66	44 63
C. D. Moore	Assistant commissioner	18	150 00	18 63
Peter H. Parker	Assistant commissioner	18	100 00	58 57
Patrick J. Sutley	Assistant commissioner	18	166 67	38 16
F. D. Tuthill	Assistant commissioner	18	150 00	18 60

August

DETAILED STATEMENT — (Continued).

PAYEE.	Position held.	Date of check.	Compensation.	Expenses.
M. T. Morgan.....	Cheese instructor.....	April 15	\$60 00	\$55 57
M. A. Perry	Expert and agent.....	" 15	100 00	11 91
Joseph M. Quigley.....	Expert and agent.....	" 15	100 00	3 97
H. A. Rees	Expert and agent.....	" 15	45 00	13 78
L. E. Scrafford	Expert and agent.....	" 15	75 00	8 13
Charles Sears.....	Expert and agent.....	" 15	24 00	26 15
E. S. Wilson	Expert and agent.....	" 15	100 00	40 10
Samuel A. Lattimore.....	Chemist	" 15	100 00	.....
W. E. McDuffie	Chemist	" 15	100 00	.....
C. J. Morganstern	Expert and agent.....	" 15	80 00	19 05
W. B. Howard	Expert and agent.....	" 21	37 50	13 02
Chas. J. Kellogg	Expert and agent.....	" 23	84 00	62 12
Simon Nusbaum	Expert and agent.....	" 30	100 00	9 45
John M. Hutchings	Stenographer	" 30	40 00	.....
George B. Fellows.....	Expert and agent.....	" 30	.....	7 21
Charles Burke.....	Expert and agent.....	" 30	100 00	54 14
J. K. Brown	Dairy commissioner.....	May 2	250 00	.....
Geo. L. Flanders	Assistant commissioner.....	" 2	166 00	.....
Geo. B. Fellows	Expert and agent.....	" 2	100 00	.....
R. D. Clark.....	Chemist	" 2	166 66	.....
George L. Flanders	Assistant commissioner.....	" 6	.....	32 74
Josiah K. Brown.....	Dairy commissioner.....	" 10	.....	24 05
J. H. Brown	Assistant commissioner.....	" 10	125 00	3 73
Peter H. Parker.....	Assistant commissioner.....	" 10	100 00	18 11
Patrick J. Sutley	Commissioner	" 10	166 67	41 99

F. D. Tuthill.....	Commissioner.....	10	150 00	21 75
B. F. Van Valkenburgh.....	Commissioner.....	10	208 33	23 46
Samuel Abrams.....	Expert and agent.....	10	100 00	15 61
Grove Barnum.....	Expert and agent.....	10	80 00	15 64
John E. Cady.....	Expert and agent.....	10	75 00	74 03
Arch D. Clark.....	Expert and agent.....	10	100 00	51 80
John J. Coughlin.....	Expert and agent.....	10	100 00	8 56
A. S. Delano.....	Expert and agent.....	10	100 00	16 06
Michael Galligan.....	Expert and agent.....	10	75 00	17 13
Frank E. Geise.....	Expert and agent.....	10	90 00	12 60
O. C. Griffiths.....	Expert and agent.....	10	80 00	53 59
W. W. Hall.....	Cheese instructor.....	10	110 00	42 79
John McGuire.....	Expert and agent.....	10	100 00	43 50
Chas. J. Morganstern.....	Expert and agent.....	10	80 00	23 02
Henry D. Myers.....	Laborer.....	10	30 00	.....
New York Stencil Works.....	Stencil plates.....	10	35 00	.....
John T. Norton.....	Expert and agent.....	10	100 00	43 10
Geo. W. Price.....	Expert and agent.....	10	80 00	52 00
H. A. Rees.....	Expert and agent.....	10	45 00	15 25
Hoffman Ruger.....	Expert and agent.....	10	75 00	14 40
L. E. Scrafford.....	Expert and agent.....	10	75 00	4 76
Geo. A. Smith.....	Cheese instructor.....	10	75 00	30 66
James W. Walsh.....	Expert and agent.....	10	80 00	34 43
E. S. Wilson.....	Expert and agent.....	10	100 00	42 65
Wm. Armstrong.....	Counsel.....	10	90 00	.....
John M. Coman.....	Counsel.....	10	40 00	.....
R. D. Clark.....	Chemist.....	10	.....	7 64
E. G. Love.....	Chemist.....	10	59 00	.....
John A. Miller.....	Chemist.....	10	100 00	.....
Stillwell & Gladding.....	Chemists.....	10	75 00	5 62
William Manlius Smith.....	Chemist.....	11	15 00	20

DETAILED STATEMENT — (Continued).

PAYEE.	Position held.	Date of check.	Compensa- tion.	Expenses.
John H. Foley.....	Assistant commissioner.....	May 17	\$150 00	\$3 84
James W. McMahon.....	Assistant commissioner.....	" 17	166 66	73 08
Geo. J. Zillig.....	Assistant commissioner.....	" 17	166 66	17 87
Geo. Bernhard.....	Expert and agent.....	" 17	100 00	10 32
Chas. S. Kellogg.....	Expert and agent.....	" 17	78 00	65 58
M. T. Morgan.....	Cheese instructor.....	" 17	75 00	49 37
M. A. Perry.....	Expert and agent.....	" 17	100 00	11 10
Joseph M. Quigley.....	Expert and agent.....	" 17	100 00	10 18
Wm. G. Spence.....	Expert and agent.....	" 17	24 00	6 16
Robert C. Turner.....	Expert and agent.....	" 17	100 00	22 58
Theodore Deecke.....	Chemist.....	" 17	20 00	.....
Joseph F. Geisler.....	Chemist.....	" 17	95 50	.....
W. E. McDuffie.....	Chemist.....	" 17	100 00	.....
Samuel A. Lattimore.....	Chemist.....	" 17	107 50	.....
Wm. Manlius Smith.....	Chemist.....	" 17	12 00	10
R. H. Palmer.....	Expert and agent.....	" 20	80 00	51 23
W. J. Corbett.....	Expert and agent.....	" 24	80 00	6 61
Robert Dalzell.....	Expert and agent.....	" 24	15 00	12 50
W. B. Howard.....	Expert and agent.....	" 24	37 50	5 85
New York Stencil Works.....	Stencil plates.....	" 24	35 00	.....
J. J. Sorogan.....	Expert and agent.....	" 24	15 00	6 00
Wm. W. Meeteer.....	Expert and agent.....	" 24	100 00	54 10
Simon Nussbaum.....	Expert and agent.....	" 27	100 00	3 90
J. M. Hutchings.....	Stenographer.....	" 27	40 00	1 43
Geo. B. Fellows.....	Expert and agent.....	" 27	.....	9 68
Josiah K. Brown.....	Dairy commissioner.....	June 1	250 00	.....

Geo. L. Flanders.....	Assistant commissioner.....	1	166 66	.....
Geo. B. Fellows.....	Expert and agent.....	1	100 00	.....
R. D. Clark.....	Chemist.....	1	168 66	.....
Lewis Cass.....	Counsel.....	3	100 00	8 15
Geo. L. Flanders.....	Assistant commissioner.....	8	.....	126 35
J. H. Brown.....	Assistant commissioner.....	9	125 00	21 06
John H. Foley.....	Assistant commissioner.....	9	150 00	4 80
James W. McMahon.....	Assistant commissioner.....	9	166 66	42 06
Peter H. Parker.....	Assistant commissioner.....	9	100 00	53 43
Patrick J. Sutley.....	Assistant commissioner.....	9	166 67	34 53
F. D. Tuthill.....	Assistant commissioner.....	9	150 00	16 60
B. F. Van Valkenburgh.....	Assistant commissioner.....	9	208 33	31 52
Geo. J. Zillig.....	Assistant commissioner.....	9	168 66	23 60
Samuel Abrams.....	Expert and agent.....	9	100 00	14 37
Grove Barnum.....	Expert and agent.....	9	80 00	28 20
Charles Burke.....	Expert and agent.....	9	100 00	41 03
John E. Cady.....	Expert and agent.....	9	75 00	71 99
Arch D. Clark.....	Expert and agent.....	9	100 00	40 20
W. J. Corbett.....	Expert and agent.....	9	80 00	7 47
John J. Coughlin.....	Expert and agent.....	9	100 00	10 59
A. S. Delano.....	Expert and agent.....	9	100 00	27 97
Michael Galligan.....	Expert and agent.....	9	75 00	19 03
Frank E. Geise.....	Expert and agent.....	9	90 00	11 20
W. W. Hall.....	Cheese instructor.....	9	130 00	78 21
John McGuire.....	Expert and agent.....	9	100 00	48 70
Wm. W. Meeteer.....	Expert and agent.....	9	100 00	47 05
M. T. Morgan.....	Cheese instructor.....	9	130 00	61 90
Charles J. Morganstern.....	Expert and agent.....	9	80 00	31 33
John T. Norton.....	Expert and agent.....	9	100 00	38 86
R. H. Palmer.....	Expert and agent.....	9	80 00	34 50
M. A. Perry.....	Expert and agent.....	9	100 00	18 80

DETAILED STATEMENT — (Continued).

PAYEE.	Position held.	Date of check.	Compensation.	Expenses.
George W. Price	Expert and agent.....	June 9	\$80 00	\$82 26
Joseph M. Quigley	Expert and agent.....	" 9	100 00	9 78
H. A. Rees.....	Expert and agent.....	" 9	78 00	42 26
Hoffman Ruger.....	Expert and agent.....	" 9	75 00	14 71
George A. Smith.....	Cheese instructor.....	" 9	150 00	47 10
J. J. Sorogan.....	Expert and agent.....	" 9	100 00	75 63
W. G. Spence	Expert and agent.....	" 9	27 00	6 63
Robert C. Turner.....	Expert and agent.....	" 9	100 00	16 36
James W. Walsh	Expert and agent.....	" 9	80 00	47 66
E. S. Wilson.....	Expert and agent	" 9	100 00	44 75
R. D. Clark.....	Chemist.....	" 6	.....	5 62
Joseph F. Geisler.....	Chemist.....	" 9	32 00	13
Joseph F. Geisler.....	Chemist.....	" 9	33 50	25
Samuel A. Lattimore.....	Chemist.....	" 9	100 00	.....
E. G. Love.....	Chemist.....	" 9	26 25	.....
W. E. McDuffie.....	Chemist.....	" 9	100 00	.....
John A. Miller.....	Chemist.....	" 9	100 00	.....
Stillwell & Gladding	Chemists	" 9	46 25	50
William Armstrong.....	Counsel.....	" 9	60 00	.....
John M. Coman.....	Counsel.....	" 9	90 00	.....
Joseph J. Marrin.....	Counsel.....	" 9	120 00	.....
Arthur C. Salmon.....	Counsel	" 9	105 00	.....
O. P. Stockwell.....	Counsel	" 9	.....	21 19
Henry D. Myers.....	Laborer.....	" 9	30 00	.....
New York Stencil Works.....	Stencil plates	" 9	35 00	.....
Robert Dalzell	Expert and agent	" 22	30 00	17 00

George Bernhard	Expert and agent	“	22	100 00	12 67
O. C. Griffis	Expert and agent	“	22	80 00	38 65
G. S. Hutchinson	Expert and agent	“	22	3 00	4 74
W. B. Howard	Expert and agent	“	22	37 50	19 41
Charles S. Kellogg	Expert and agent	“	22	78 00	53 06
L. E. Scrafford	Expert and agent	“	22	75 00	13 92
Maurice Perkins	Expert and agent	“	22	15 00	.....
J. K. Brown	Dairy commissioner	July	1	250 00	.....
George L. Flanders	Assistant commissioner	“	1	166 68	.....
George B. Fellows	Expert and agent	“	1	100 00	.....
R. D. Clark	Chemist	“	1	166 68	.....
Charles Burke	Expert and agent	“	1	100 00	61 65
George B. Fellows	Expert and agent	“	1	.....	13 19
Simon Nusbaum	Expert and agent	“	1	100 00	.....
John M. Hutchings	Stenographer	“	1	40 00	.....
J. K. Brown	Dairy commissioner	“	11	.....	26 20
J. H. Brown	Assistant commissioner	“	11	150 00	16 42
James W. McMahon	Assistant commissioner	“	11	166 66	60 45
Peter H. Parker	Assistant commissioner	“	11	100 00	58 49
Patrick J. Sutley	Assistant commissioner	“	11	166 67	36 46
B. F. Van Valkenburgh	Assistant commissioner	“	11	208 33	31 86
George J. Zillig	Assistant commissioner	“	11	166 66	18 32
Samuel Abrams	Expert and agent	“	11	100 00	15 96
Grove Barnum	Expert and agent	“	11	80 00	19 15
John E. Cady	Expert and agent	“	11	75 00	79 96
Arch D. Clark	Expert and agent	“	11	100 00	63 50
John J. Coughlin	Expert and agent	“	11	100 00	15 25
Robert Dalzell	Expert and agent	“	11	81 00	64 85
A. S. Delano	Expert and agent	“	11	100 00	17 55
Michael Galligan	Expert and agent	“	11	75 00	16 78
Frank E. Geise	Expert and agent	“	11	90 00	12 51

DETAILED STATEMENT — (Continued).

PAYEE.	Position held.	Date of check.	Compensa- tion.	Expenses.
W. W. Hall.....	Cheese instructor.....	July 11	\$150 00	\$65 40
W. B. Howard.....	Expert and agent.....	" 11	75 00	21 83
W. W. Meeteer.....	Expert and agent.....	" 11	100 00	64 95
M. T. Morgan.....	Cheese instructor.....	" 11	130 00	68 67
Charles J. Morganstern.....	Expert and agent.....	" 11	80 00	20 81
John T. Norton.....	Expert and agent.....	" 11	100 00	36 30
H. A. Rees.....	Expert and agent.....	" 11	78 00	46 09
Hoffman Ruger.....	Expert and agent.....	" 11	75 00	9 56
L. B. Scrafford.....	Expert and agent.....	" 11	100 00	17 30
George A. Smith.....	Cheese instructor.....	" 11	150 00	48 35
W. G. Spence.....	Expert and agent.....	" 11	91 00	34 40
Robert C. Turner.....	Expert and agent.....	" 11	100 00	11 98
E. S. Wilson.....	Expert and agent.....	" 11	100 00	40 00
R. D. Clark.....	Chemist.....	" 11	.....	18 16
John A. Miller.....	Chemist.....	" 11	100 00	.....
William Armstrong.....	Counsel.....	" 11	60 00	.....
Joseph J. Marrin.....	Counsel.....	" 11	30 00	.....
Henry J. McCormick.....	Counsel.....	" 11	25 00	46
Henry D. Myers.....	Laborer.....	" 11	30 00	.....
George L. Flanders.....	Assistant commissioner.....	" 22	.....	21 94
John H. Foley.....	Assistant commissioner.....	" 22	150 00	4 80
F. D. Tuthill.....	Assistant commissioner.....	" 22	150 00	17 10
George Bernhard.....	Expert and agent.....	" 22	100 00	10 44
W. J. Corbett.....	Expert and agent.....	" 22	80 00	12 62
Charles S. Kellogg.....	Expert and agent.....	" 22	60 00	44 84
John McGuire.....	Expert and agent.....	" 22	100 00	42 96

D. P. McMahon	Expert and agent	22	48 00	13 85
R. H. Palmer	Expert and agent	22	80 00	57 11
Marcus A. Perry	Expert and agent	22	100 00	17 78
George W. Price	Expert and agent	22	80 00	67 30
Joseph M. Quigley	Expert and agent	22	100 00	8 82
James E. Ryan	Expert and agent	22	10 00	2 98
J. J. Sorogan	Expert and agent	22	100 00	70 79
James W. Walsh	Expert and agent	22	80 00	41 48
Joseph F. Geisler	Chemist	22	67 13	60
Samuel A. Lattimore	Chemist	22	100 00	
W. E. McDuffie	Chemist	22	100 00	
Wm. Manlius Smith	Chemist	22	6 00	20
Stillwell & Gladding	Chemists	22	66 61	
Lewis Cass	Counsel	22	75 00	
Charles D. Olendorf	Counsel	22	120 00	
Charles Burke	Expert and agent	28	100 00	40 67
George B. Fellows	Expert and agent	28		9 45
Simon Nussbaum	Expert and agent	28	100 00	11 85
J. M. Hutchings	Stenographer	28	40 00	
George B. Fellows	Expert and agent	28	100 00	
J. K. Brown	Dairy commissioner	1	250 00	
Geo. L. Flanders	Assistant commissioner	1	166 66	
R. D. Clark	Chemist	1	166 66	
Geo. L. Flanders	Assistant commissioner	15		167 55
James H. Brown	Assistant commissioner	18	150 00	24 37
John H. Foley	Assistant commissioner	18	150 00	6 70
James W. McMahon	Assistant commissioner	18	166 66	44 63
C. D. Moore	Assistant commissioner	18	150 00	18 63
Peter H. Parker	Assistant commissioner	18	100 00	58 57
Patrick J. Sutley	Assistant commissioner	18	166 67	38 16
F. D. Tuthill	Assistant commissioner	18	150 00	18 60

DETAILED STATEMENT — (Continued).

PAYEE.	Position held.	Date of check.	Compensation.	Expenses.
B. F. Van Valkenburgh	Assistant commissioner.....	August 18	\$208 33	\$26 85
Geo. J. Zillig.....	Assistant commissioner.....	" 18	166 66	22 72
Samuel Abrams.....	Expert and agent	" 18	100 00	12 39
Grove Barnum	Expert and agent	" 18	80 00	17 23
Geo. Bernhard.....	Expert and agent	" 18	100 00	25 95
John E. Cady	Expert and agent	" 18	75 00	72 51
Arch D. Clark	Expert and agent	" 18	100 00	70 95
W. J. Corbett.....	Expert and agent	" 18	80 00	71 56
John J. Coughlin.....	Expert and agent	" 18	100 00	15 66
Robert Dalzell	Expert and agent	" 18	78 00	67 10
D. P. McMahon	Expert and agent	" 18	39 00	10 74
J. J. Sorogan	Expert and agent	" 18	100 00	75 34
W. G. Spence	Expert and agent	" 18	91 00	34 57
R. D. Clark.....	Expert and agent	" 18	50 00	10 95
A. S. Delano.....	Expert and agent	" 18	100 00	20 78
Michael Galligan	Expert and agent	" 18	75 00	31 83
Frank E. Geise.....	Expert and agent	" 18	90 00	12 64
W. W. Hall.....	Cheese instructor.....	" 18	130 00	91 92
John McGuire.....	Expert and agent	" 18	100 00	59 25
Win. W. Meeteer.....	Expert and agent	" 18	100 00	71 70
M. T. Morgan.....	Cheese instructor.....	" 18	130 00	92 79
Charles J. Morganstern.....	Expert and agent	" 18	80 00	27 57
John T. Morton	Expert and agent	" 18	100 00	56 70
R. H. Palmer	Expert and agent	" 18	80 00	58 35
Marcus A. Perry.....	Expert and agent	" 18	100 00	24 94
George W. Price	Expert and agent	" 18	80 00	27 25

Joseph M. Quigley	Expert and agent	"	18	100 00	15 00
H. A. Rees	Expert and agent	"	18	430 00	52 19
Hoffman Ruger	Expert and agent	"	18	75 00	16 50
L. E. Serafford	Expert and agent	"	18	100 00	.....
Charles Sears	Expert and agent	"	18	18 00	22 15
George A. Smith	Cheese instructor	"	18	150 00	54 58
Robert C. Turner	Expert and agent	"	18	100 00	15 28
James W. Walsh	Expert and agent	"	18	80 00	54 63
Francis E. Engelhard	Chemist	"	18	6 00	20
Joseph E. Geisler	Chemist	"	18	88 95	.....
Samuel A. Lattimore	Chemist	"	18	100 00	.....
W. E. McDuffie	Chemist	"	18	100 00	.....
John A. Miller	Chemist	"	18	100 00	.....
Stillwell & Gladding	Chemists	"	18	30 00	50
James B. Egan	Counsel	"	18	40 00	45
Henry J. McCormick	Counsel	"	18	30 00	.....
Henry D. Myers	Laborer	"	18	30 00	.....
Henry D. Myers	Laborer	"	18	3 87	.....
E. A. Ayres	Expert and agent	"	18	85 00	43 94
W. B. Howard	Expert and agent	"	18	75 00	24 97
Charles S. Kellogg	Expert and agent	"	18	80 00	62 75
E. S. Wilson	Expert and agent	"	27	100 00	59 75
George W. Roderick	Counsel	"	27	120 00	.....
George L. Flanders	Assistant commissioner	"	31	.....	44 32
Charles Burke	Expert and agent	"	31	100 00	66 50
George B. Fellows	Expert and agent	"	31	.....	29 44
Simon Nussbaum	Expert and agent	"	31	100 00	32 36
J. M. Hutchings	Stenographer	"	31	40 00	.....
J. K. Brown	Dairy commissioner	"	31	250 00	.....
George L. Flanders	Assistant commissioner	September	1	166 66	.....
George B. Fellows	Expert and agent	"	1	100 00	.....

DETAILED STATEMENT — (Continued).

PAYER.	Position held.	Date of check.	Compensa- tion.	Expenses.
R. D. Clark	Chemist	September 1	\$166 66	.....
J. K. Brown	Dairy commissioner.	" 1	.....	\$30 10
James H. Brown	Assistant commissioner	" 15	150 00	59 52
C. D. Moore	Assistant commissioner	" 15	150 00	35 09
J. W. McMahon	Assistant commissioner	" 15	166 66	70 83
Peter H. Parker	Assistant commissioner	" 15	100 00	85 14
Patrick J. Sutley	Assistant commissioner	" 15	166 67	52 82
F. D. Tuthill	Assistant commissioner	" 15	150 00	17 85
B. F. Van Valkenburgh	Assistant commissioner	" 15	208 33	92 77
George J. Zillig	Assistant commissioner	" 15	166 66	17 41
Samuel Abrams	Expert and agent	" 15	100 00	11 33
Grove Barnum	Expert and agent	" 15	80 00	27 77
John E. Cady	Expert and agent	" 15	75 00	101 70
Arch D. Clark	Expert and agent	" 15	100 00	46 75
W. J. Corbett	Expert and agent	" 15	80 00	30 86
John J. Coughlin	Expert and agent	" 15	100 00	10 40
A. S. Delano	Expert and agent	" 15	83 00	77 00
Michael Galligan	Expert and agent	" 15	75 00	27 16
Frank E. Geise	Expert and agent	" 15	90 00	14 11
W. B. Howard	Expert and agent	" 15	75 00	66 54
Charles S. Kellogg	Expert and agent	" 15	80 00	62 78
John H. Berry	Expert and agent	" 15	15 00	8 45
Robert Dalzell	Expert and agent	" 15	83 00	77 00
D. P. McMahon	Expert and agent	" 15	54 00	4 00
J. J. Sorogan	Expert and agent	" 15	100 00	102 96
W. G. Spence	Expert and agent	" 15	94 50	41 67

E. A. Ayres.....	Expert and agent	"	15	135 00	47 65
R. D. Clark.....	Expert and agent	"	15	50 00	10 00
W. W. Meeteer	Expert and agent	"	15	100 00	58 20
John McGuire.....	Expert and agent	"	15	100 00	54 35
Chas. J. Morganstern.....	Expert and agent	"	15	80 00	49 30
John T. Norton	Expert and agent	"	15	100 00	50 55
R. H. Palmer	Expert and agent	"	15	80 00	56 48
Geo. W. Price.....	Expert and agent	"	15	80 00	58 52
H. A. Reese.....	Expert and agent	"	15	135 00	54 10
Hoffman Ruger.....	Expert and agent	"	15	75 00	9 32
L. E. Scrafford	Expert and agent	"	15	100 00	5 70
R. C. Turner.....	Expert and agent	"	15	100 00	14 42
James W. Walsh	Expert and agent	"	15	80 00	56 07
E. S. Wilson	Expert and agent	"	15	100 00	53 81
W. W. Hall.....	Expert and agent	"	15	135 00	93 23
M. T. Morgan.....	Expert and agent	"	15	135 00	68 77
Geo. A. Smith.....	Expert and agent	"	15	150 00	65 85
R. D. Clark.....	Chemist.....	"	15	.....	55 34
John A. Miller	Chemist.....	"	15	100 00	.....
Wm. Manlius Smith.....	Chemist	"	15	48 00	90
A. W. Landsitte.....	Chemist.....	"	15	74 00	.....
Chas. Van Loon	Laborer.....	"	15	26 13	.....
John H. Foley	Assistant commissioner	"	21	150 00	8 56
Geo. Bernhard.....	Expert and agent	"	21	100 00	24 53
Marcus A. Perry	Expert and agent	"	21	100 00	23 00
Samuel A. Lattimore	Chemist.....	"	21	100 00	.....
Joseph M. Quigley.....	Expert and agent	"	21	100 00	15 02
W. E. McDuffie	Chemist.....	"	21	100 00	.....
Wm. Manlius Smith.....	Chemist.....	"	21	12 00	30
Riley & Cantwell	Counsel.....	"	21	75 00	.....
Lewis Cass	Counsel	"	21	25 00	.....

DETAILED STATEMENT — (Concluded).

PAYEE.	Position held.	Date of check.	Compensa- tion.	Expense.
V. P. Douw Lee	Expert and agent	September 21	\$77 00	.....
Amasa J. Parker, Re'r, Weed, Parsons & Co.	Printing.....	" 23	.....	\$530 70
Theodore Deecke	Chemist.....	" 23	15 00	.....
J. K. Brown	Dairy commissioner	" 27	250 00	.....
Geo. L. Flanders.....	Assistant commissioner	" 27	166 68	.....
Geo. B. Fellows	Expert and agent	" 27	100 00	.....
R. D. Clark	Chemist.....	" 27	166 68	.....
Geo. L. Flanders.....	Assistant commissioner	" 30	.....	183 96
Chas. Burke	Expert and agent	" 30	100 00	52 26
Geo. B. Fellows	Expert and agent ..	" 30	.....	15 12
Simon Nussbaum	Expert and agent	" 30	100 00	1 75
J. M. Hutchings.....	Stenographer	" 30	40 00	.....
Edward Murphy, 2d	Counsel	" 30	25 00	.....
Comptroller.....	Stationery.....	" 30	.....	121 64

While the methods of employes connected with this department may not at all times have met with the approval of some of those interested in our work, and criticism rather than commendation has sometimes met us, it is respectfully suggested that in minor matters it is hard to reconcile conflicting opinions as to methods or means best to be used. The fight that we have been through has been hard, the questions that we have met with in the courts have been closely and hotly contested, and it has not always been easy to determine just the proper thing to do or proper move to make, but whatever was determined upon, or whatever was done, was in full faith that it was the best thing to do in order to obtain the best results for the people under the law as it existed. As to whether our judgment in these matters was always good, is a question which should now be determined by the results obtained. In conclusion, it gives me pleasure to bear testimony to the zeal and faithfulness of the appointees and employes of this department, without which the results as they now exist would have been impossible.

J. K. BROWN,
New York State Dairy Commissioner.

APPENDIX.

In the appendix to this report will be found the report of the assistant commissioners, cheese instructors and department chemist, as follows:

Report of B. F. Van Valkenburgh, assistant commissioner, second division.

Report of F. D. Tuthill, assistant commissioner, third division.

Report of James H. Brown, assistant commissioner, fourth division.

Report of Charles D. Moore, assistant commissioner, fifth division.

Report of Peter H. Parker, assistant commissioner, sixth division.

Report of P. J. Sutley, assistant commissioner, seventh division.

Report of John H. Foley, assistant commissioner, eighth division.

Report of Geo. J. Zillig, assistant commissioner, ninth division.

Report of James W. McMahon, assistant commissioner, tenth division.

Report of Geo. A. Smith, cheese instructor.

Report of W. W. Hall, cheese instructor.

Report of M. T. Morgan, cheese instructor.

Report of H. A. Rees, cheese instructor.

Report of Dr. R. D. Clark, department chemist.

Report of B. F. Van Valkenburgh.

Hon. JOSIAH K. BROWN, *Dairy Commissioner, State of New York, Albany, N. Y.:*

Sir.—I have the honor to submit this my ninth annual report as assistant commissioner, giving in detail the work performed in the second division of the dairy department during the year ended September 30, 1892.

Nothing of special interest, out of the usual line of duties, has occurred during the year and the work in the second division of the dairy department has progressed on the usual lines. The State experts have been kept continuously employed inspecting stores, hotels and restaurants to see whether or not any of the dairy laws were being violated by the use of oleomargarine, adulterated milk or vinegar, and in watching the different railroad depots, express offices and steamboat docks; also in prosecuting cases whenever evidence of violation of the law has been discovered.

As stated in my last annual report I have found the plan of watching the routes over which adulterated goods must arrive in order to be distributed within the State, and following them to their destination, a much cheaper and better plan than to go from store to store inspecting, and from one hotel or restaurant to another sampling, the butter or substitutes for the same served on their tables to learn whether or not the dairy laws were being violated.

The manufacturers of oleomargarine have, through their agents, continued to canvass during the entire year assuming that they were protected under the original package decision against prosecution.

The plan pursued by them is to send their agents into this State from adjoining States and take orders for their goods and

then ship the goods into the State from some adjoining State; in this manner they avoid raising any new points of law of material interest that could be brought to the attention of the court of last resort in this State.

These agents have used every argument that they could possibly make to induce citizens of the State of New York to violate the laws. They have met with but little success so far as the retail grocers are concerned, having succeeded — so far as we have been able to discover — in persuading only five of this class of dealers to handle their goods and those parties were soon discovered violating the laws, were prosecuted, and four of them convicted. But they have met with better success this year than last in inducing hotel and restaurant-keepers to serve their goods upon their tables. Fifty-two of this class of offenders against the dairy laws were discovered during the year and were prosecuted, a detailed statement of which will appear later in this report.

This assumption that they have a right to sell their commodities within the State in the original package and their continued efforts to sell the goods to hotels, restaurants and boarding-houses in that form has added to our work greatly, making it more difficult to keep the sale of these unlawful goods under control; and, in order to properly protect the consumers of dairy products against being defrauded by having them served to them on the tables of such places or sold to them by retail dealers as and for butter, it is necessary that a larger force of experts should be employed in this division than has been employed during the past year. In order to keep the sale of these spurious goods under reasonable control during the past year, I have been compelled to keep the small force employed in this division, the greater part of the year, on the duty of looking after violations of law by those that were formerly handling oleomargarine, therefore, liable to handle it again, knowing full well from former experience that many retail dealers, restaurant-keepers and hotels, would handle these spurious goods whenever the vigilance of the experts employed by the dairy commission was relaxed to the slightest extent.

The following table, compiled from the statement of the manufacturers referred to for 1886, and the reports of the commissioner of internal revenue, show the amount manufactured and sold during the past seven years, viz.:

Manufacturers' estimate for the year ending June 30, 1886		\$100,000,000
June 30, 1886, to November 1, 1886, estimated at....		\$3,305,376
Eight months internal revenue report to June 30, 1887		21,694,624
For the year ending June 30, 1887.....		\$25,000,000
For the year ending June 30, 1888, revenue report...		\$34,325,527
For the year ending June 30, 1889, revenue report...		35,664,026
For the year ending June 30, 1890, revenue report...		30,960,286
For the year ending June 30, 1891, revenue report...		43,215,512
For the year ending June 30, 1892, revenue report...		46,915,501

The following statistics, taken from my last annual report, showing the amount of butter handled in New York, do not show any increase during the years ending November 1, 1885, 1886 and 1887, but shows that about the same amount was received each year, which is accounted for by the fact that oleomargarine was formerly shipped by the manufacturers and dealers as butter, and entered into the statistics as such there being no way to separate the two. In addition to the oleomargarine received from other States, and included in the figures hereinafter given, there was a large quantity made in the city and State of New York, previous to 1886, not included in these figures; therefore, the increased production of butter for the New York market within the past five years has equaled the amount of oleomargarine formerly consumed, and has also supplied the increase of the population with butter as well as the increased amount for export previously noted.

The following statistics showing the number of pounds and value of butter received in New York city yearly, from 1882 to 1891, inclusive, copied from my last annual report, may be of

interest as showing the decline from 1882 to 1885, and the advance from 1885 to 1888, and for comparison with the receipts and value of the product handled during the years ending October 31, 1889, 1890, 1891 and 1892

RECEIPTS AND VALUE OF BUTTER HANDLED IN NEW YORK CITY FOR ELEVEN YEARS ENDING NOVEMBER 1, 1890.

For the Year ending November 30, 1882.

Eastern, 44,215,990 pounds, valued at twenty-nine and one-half cents per pound.....	\$13,043,717 05
Western, 35,648,850 pounds, valued at twenty-eight cents per pound	9,981,678 00
Total, 79,864,840	\$23,025,295 05

For the Year ending November 30, 1883.

Eastern, 44,804,060 pounds, valued at twenty-six cents per pound	\$11,649,055 60
Western, 45,743,850 pounds, valued at twenty-four cents per pound	10,978,524 00
Total, 90,547,910 pounds	\$22,627,579 60

For the Year ending November 30, 1884.

Eastern, 38,263,820 pounds, valued at twenty- four and one-half cents per pound.....	\$9,374,635 90
Western, 49,853,350 pounds, valued at twenty- two cents per pound.....	10,967,737 00
Total, 88,117,170 pounds	\$20,342,372 90

For the Year ending October 31, 1885.

Eastern, 39,480,350 pounds, valued at twenty- two cents per pound	\$8,685,677 00
Western, 54,086,500 pounds, valued at twenty- two cents per pound	10,817,300 00
Total, 93,566,850 pounds	\$19,502,977 00

For the Year ending October 31, 1886.

Eastern, 38,985,520 pounds, valued at twenty-three and one-half cents per pound.....	\$9,161,597 20
Western, 54,716,000 pounds, valued at twenty-one and one-half cents per pound.....	11,763,940 00
Total, 93,701,520 pounds	\$20,925,537 20
Deduct value of product handled in 1885.....	19,502,977 00
	<hr/>
	\$1,422,560 20
Deduct value of increased receipts over 1885..	28,954 05
	<hr/>
Net gain on same amount of receipts of butter over 1885	\$1,393,606 15
	<hr/>
Total value of milk and cream handled in New York, for the year ending October 31, 1886..	\$8,160,750 00
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For the Year ending October 31, 1887 (Butter, Milk and Cream).

Butter.

Eastern, 37,062,130 pounds, valued at twenty-four cents per pound	\$8,894,911 20
Western, 56,650,350 pounds, valued at twenty-two cents per pound	12,463,077 00
	<hr/>
Total, 93,712,480 pounds, value	\$21,357,988 20
Value of milk and cream	9,499,900 00
	<hr/>
	\$30,857,888 20
Deduct value of butter, milk and cream handled in 1886	29,086,287 20
	<hr/>
Net gain in 1887 over 1886.....	\$1,771,601 00
Add net gain in cheese of 1887 over 1886.....	687,843 00
	<hr/>
Total net gain on butter, cheese, milk and cream handled in New York in 1887 over 1886	\$2,459,444 00
	<hr/>

For the Year Ending October 31, 1888 (Dairy Products).

Butter.

Eastern, 31,784,410 pounds, valued at twenty-four and one-half cents per pounds.....	\$7,787,180 45
Western, 63,457,950 pounds, valued at twenty-two and one-half cents per pound	14,278,098 75
	<hr/>
Total value of butter handled.....	\$22,065,219 20
	<hr/> <hr/>

Cheese.

Eastern, 98,877,955 pounds, valued at ten and one-half cents per pound.....	\$10,382,185 27
Western, 3,637,260 pounds, valued at eight and one-half cents per pound.....	309,167 10
In transit for export, 7,636,850 pounds, valued at ten cents per pound	763,685 00
	<hr/>
Total 110,152,065 pounds, valued at.....	\$11,455,037 37
	<hr/> <hr/>

Milk.

Crude, gallons	58,678,390
Cream, gallons	1,191,940
Condensed milk, gallons, pearl	751 830
	<hr/>
Total (valued at \$9,652,500) gallons	60,622,160
	<hr/> <hr/>

Total value of butter handled.....	\$22,065,219 20
Total value of cheese handled.....	11,455,037 37
Total value of milk and cream handled.....	9,652,500 00
	<hr/>

Total	\$43,172,756 57
Deduct total value of dairy products handled in 1887	43,047,771 02
	<hr/>

Net gain in 1888 over 1887	\$124,985 55
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The gain in value over 1887 is light, for the reason that the average price of cheese has been one cent per pound lower than in 1887, although butter averaged one-half cent higher.

For the Year Ending October 31, 1889 (Dairy Products).

Butter.

Eastern, 30,626,610 pounds, valued at twenty-three cents per pound.....	\$7,044,120 30
Western, 77,820,650 pounds, valued at twenty-one cents per pound.....	16,342,336 50
	<hr/>
Total, 108,447,260 pounds, valued at.....	\$23,386,456 80
	<hr/> <hr/>

Cheese.

Eastern, 101,712,655 pounds, valued at ten cents per pound	\$10,171,265 50
Western, 3,660,120 pounds, valued at nine cents per pound	329,410 80
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Total, 105,372,775 pounds, valued at.....	\$10,500,676 30
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Milk.

Six million four hundred and twenty-one thousand three hundred and eighty-seven cans of crude milk of ten gallons.....	64,213,870
Seventy-six thousand six hundred and seven cans unsweetened condensed milk of ten gallons	766,070
One hundred and thirty-two thousand two hundred and eighty-four cans of cream of ten gallons	1,322,840
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Total gallons	66,302,780
Valued at	\$9,500,500 00
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According to the estimate of those best informed on the subject, there has been 1,500,000 forty-quart cans of milk produced within the State of New York during the year, reported sold to condensers, most of which reaches this market in a condensed form in small cans, valued in the crude state at \$2,175,000, making a total of \$11,675,500.

Total value of butter handled	\$23,386,456 80
Total value of cheese handled	10,500,676 30
Total value of milk, cream and condensed milk handled	11,675,500 00
Total	\$45,562,633 10
Deduct total value of dairy product handled in 1888	43,172,756 51
Net gain in 1889 over 1888 is	\$2,389,876 59
Less value of condensed milk in small cans, 1888	2,175,000 00
Total	\$214,876 59

The receipts of eastern butter for the year ending October 31, 1889, were 1,157,800 pounds less than in the previous year, while the amount of cheese received was 2,834,700 pounds in excess of 1888, showing that just about the same amount of product of the dairy in butter and cheese from the State of New York has been marketed as in the previous year.

For the Year ending October 31, 1890 (Dairy Products).

Butter.

Eastern, 26,560,660 pounds, valued at twenty cents per pound	\$5,312,132 00
Western, 71,094,500 pounds, valued at eighteen cents per pound	12,797,010 00
Total, 97,655,160 pounds, valued at	\$18,109,142 00

Cheese.

Eastern, 102,118,115 pounds, valued at nine and three-fourth cents per pound	\$9,956,516 22
Western, 3,483,090 pounds, valued at eight cents per pound	278,647 20
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Total, 105,601,205 pounds, valued at	\$10,235,173 42
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Milk.

Six million two hundred and eighty-five thousand two hundred and ninety-four cans crude milk of ten gallons each	62,852,940
Sixty-nine thousand three hundred and sixty-seven cans unsweetened condensed milk of ten gallons each	693,670
One hundred and thirty-seven thousand three hundred and twenty-two cans cream of ten gallons each	1,373,220
There is also produced within the State of New York and sold during the year to condensers, most of which reaches this market in condensed form in small cans, a large amount of crude milk, estimated to be equal to 1,650,000 cans of crude milk of ten gallons each	
	16,500,000
<hr/>	
Total gallons	81,419,830
Valued at	\$12,085,000 00
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Total value of butter handled	\$18,109,142 00
Total value of cheese handled	10,233,172 42
Total value of milk, cream and condensed milk handled	12,085,000 00
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Total value	\$40,427,314 42
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For the Year ending October 31, 1891 (Dairy Products).

Butter.

Eastern, 395,301 packages of seventy pounds average, 27,671,070 pounds, valued at twenty-three cents per pound	\$6,361,346 10
Western, 1,408,324 packages of fifty pounds average, 70,416,200 pounds, valued at twenty-one cents per pound	14,787,402 00
Total pounds, 98,087,270, value	<u>\$21,151,748 10</u>

Cheese.

Eastern, 86,959,200 pounds, valued at ten cents per pound	\$8,695,920 00
Western, 3,331,950 pounds, valued at nine cents per pound	299,875 50
Total pounds, 90,391,150, value	<u>\$8,995,795 50</u>

Milk.

Six million three hundred and five thousand seven hundred and sixty-six cans of crude milk of ten gallons each.....	63,057,660
Sixty-nine thousand nine hundred and eighty-nine cans of unsweetened condensed milk of ten gallons each	699,890
One hundred and forty-four thousand one hundred and ninety-eight cans of cream of ten gallons each	1,441,980
There is also produced within the State of New York and sold during the year to condensers, most of which reaches the New York market in condensed form in small cans, a large amount of crude milk, estimated to be not less than	17,500,000
Total gallons	<u>82,699,530</u>
Valued at	<u>\$14,129,677 00</u>

Total value of butter handled	21,151,748 10
Total value of cheese handled	8,995,795 50
Total value of milk, cream and condensed milk handled	11,129,677 60
<hr/>	
Total value of dairy products handled dur- ing the year	\$44,277,220 60
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The preceding statistics show a material decrease in the amount of pounds of butter handled in this city, but as the average price of butter has been three cents per pound higher, the total value of the dairy product handled was \$3,042,606.10 greater than during the previous year.

For the Year ending October 31, 1892 (Dairy Products).

Butter.

Eastern, 414,756 packages of seventy pounds average, 29,032,920 pounds, valued at twenty- four cents per pound	\$6,967,900 80
Western, 1,248,412 packages of fifty pounds average, 62,420,600 pounds, valued at twenty- two cents per pound	13,732,532 00
<hr/>	
Total pounds, 91,433,520, value	\$20,700,432 80
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Cheese.

Eastern, 91,033,950 pounds, valued at eleven cents per pound	\$10,013,734 50
Western, 4,736,510 pounds, valued at ten cents per pound	473,651 00
<hr/>	
Total pounds, 95,770,310, value	\$10,487,385 50
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Milk.

Seven million forty thousand three hundred and forty-two cans of crude milk of ten gallons each	70,403,420
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Sixty-one thousand six hundred and ninety cans of unsweetened condensed milk of ten gallons each	616,900
One hundred and eighty-two thousand six hun- dred and eighty-nine cans of cream of ten gallons each	1,826,890
There is also produced within the State of New York and sold during the year to condensers, most of which reaches New York market in condensed form in small cans, a large amount of crude milk, estimated to be not less than..	18,000,000
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Total gallons milk, cream and condensed milk	90,847,210
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Value of crude milk handled	\$10,977,559 97
Value of cream handled	1,050,461 75
Value of unsweetened condensed milk	388,647 00
Value of crude milk sold to condensers	2,700,000 00
<hr/>	
	\$15,116,668 72
<hr/>	
Total value of butter handled	\$20,700,432 80
Total value of cheese handled	10,487,385 50
Total value of milk, cream, and condensed milk handled	15,166,668 72
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Total value of dairy products handled dur- ing the year	\$46,354,487 02
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Increase in Value.

The total increase in value of dairy products over value of products handled in 1891 was \$2,077,267.02.

The preceding figures show a material increase in the amount and value of eastern dairy products handled in the

city of New York during the year, as shown by the following statement:

Butter, increase, 1,361,850 pounds, valued at..	\$326,844 00
Cheese, increase, 4,074,750 pounds, valued at..	148,222 50
Crude milk, cream and condensed milk, increase, 8,147,680 gallons, valued at	986,991 72
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Net gain in increased receipts	\$1,762,058 22
Net gain in advance of price over 1891	1,146,302 70
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Total gain for year	\$2,908,360 92
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The above statistics show a gain of nearly \$3,000,000 in the value of eastern dairy products in 1892, and of nearly \$5,000,000 as compared to 1890, which is mainly the product of New York State, as at least seven-eighths of the receipts in New York city reported under the heading of eastern are produced in the State of New York. This enormous increase in the production of butter and cheese in this State is, without doubt, in a great measure to be attributed to the confidence which the dairymen have in the stability of our dairy laws and in the proper enforcement of the same.

While the receipts of eastern dairy products have increased so extensively, the receipts of western dairy products during the past year have decreased very materially. The foregoing statistics show that the receipts of western cheese were 1,404,560 pounds greater than the previous year, and that the receipts of butter were 7,995,600 pounds less, making a net reduction in the value of the western receipts, as compared with 1891, of \$1,618,576. notwithstanding the advance of one cent per pound on both butter and cheese over the former year.

This decrease in western dairy products was, without doubt, caused, to some extent, by the wet spring, followed by a dry summer; but was due, to a greater extent, to the fact that the dairy laws in the Western States are not effective; therefore, the dairymen anticipate a greater competition with oleomargarine and are, for this reason, turning their attention to the production of other farm products.

EXPORTS OF BUTTER AND CHEESE.

The following statistics, taken from the records of New York Mercantile Exchange, show the exports of butter and cheese each year since January 1, 1883:

Butter.	
	Pounds.
From the port of New York, 1883.....	18,811,400
From the port of New York, 1884.....	15,865,600
From the port of New York, 1885.....	14,601,550
From the port of New York, 1886.....	11,677,750
From the port of New York, 1887.....	9,933,400
From the port of New York, 1888.....	7,099,650
From the port of New York, 1889.....	19,941,176
From the port of New York, 1890.....	20,623,534
From the port of New York, 1891.....	11,115,505
From the port of New York, 1892*	7,793,479
From all ports in the United States, 1883.....	22,375,708
From all ports in the United States, 1884.....	21,391,196
From all ports in the United States, 1885.....	19,593,872
From all ports in the United States, 1886.....	14,404,727
From all ports in the United States, 1887.....	12,531,171
From all ports in the United States, 1888.....	8,749,366
From all ports in the United States, 1889.....	25,983,054
From all ports in the United States, 1890.....	23,895,914
From all ports in the United States, 1891.....	14,970,533
From all ports in the United States, 1892*	9,688,402

The preceding statistics show that there have been 2,180,306 pounds less of butter exported from the port of New York during the first ten months of 1892 than during the corresponding ten months in 1891; also that the receipts of butter in New York city during the year ending October 31, 1892, were 6,633,750 pounds less than during the previous year. After deducting 2,180,306 less pounds exported, which was therefore left for home trade, from the 6,633,750 pounds decrease in receipts, we still have 4,450,444 pounds less of butter on October 31, 1892, for home trade than in the former year.

* Ten months.

According to the best data obtainable, there has been as much butter consumed during the year ending October 31, 1892, as during the previous year; therefore, the shortage of about four and one-half million pounds of butter for home trade is to be accounted for by the fact that there is, at least, that amount less in cold storage held for future trade than there was on October 31, 1891.

Cheese.

	Pounds.
From the port of New York, 1883.....	97,897,850
From the port of New York, 1884.....	96,634,250
From the port of New York, 1885.....	82,934,750
From the port of New York, 1886.....	78,763,400
From the port of New York, 1887.....	72,529,500
From the port of New York, 1888.....	75,830,700
From the port of New York, 1889.....	75,046,826
From the port of New York, 1890.....	70,208,270
From the port of New York, 1891.....	61,299,205
From the port of New York*	60,053,656
From all ports in the United States, 1883.....	111,973,140
From all ports in the United States, 1884.....	111,950,686
From all ports in the United States, 1885.....	95,047,243
From all ports in the United States, 1886.....	86,363,685
From all ports in the United States, 1887.....	87,069,804
From all ports in the United States, 1888.....	81,595,304
From all ports in the United States, 1889.....	98,140,486
From all ports in the United States, 1890.....	91,014,571
From all ports in the United States, 1891.....	77,148,794
From all ports in the United States, 1892*.....	74,210,466

The above statistics show that although the advance in the price of cheese has been one cent per pound, that the exports during the first ten months of this year have increased 2,282,593 pounds, which is without doubt caused by foreigners having gained more confidence in American cheese by reason of the strict enforcement of our dairy laws, and that the receipts for the year

* Ten months.

ending October 31, 1892, were 4,379,310 pounds more than in the previous year. This shows that there has been a great deal more consumed at home than in the previous year, which is, without doubt owing to the improvment in the quality of the cheese manufactured in the State of New York.

DETAILED REPORT OF THE WORK PERFORMED
(OLEOMARGARINE.)

The following is a detailed report of the work performed by each employe of the department between September 30, 1891, and October 1, 1892, in prosecuting violators of the laws relating to the sale of oleomargarine:

Edmund S. Wilson, expert, employed in the above service 114 days:

Number of days in court	18
Number of days obtaining evidence	16
Number of days inspecting stores	37
Number of days on special duty	2
Number of days visiting hotels, restaurants and boarding-houses	41
Total number of days	114

Number of samples purchased and taken	306
Number of samples delivered to chemists	6
Number of evenings obtaining samples	
Number of appearances in cases	27
Number of complaints made	3
Number hotels, restaurants and boarding-houses visited..	377
Number of stores inspected,.....	1,054
Estimated number of miles traveled	4,025

Joseph J. Sorogan, expert, employed in the above service twenty-two days:

Number of days in court	
Number of days obtaining evidence	18
Number of days inspecting stores	2

Number of days on special duty	2
Number of days visiting hotels, restaurants and boarding-houses	

Total number of days	22
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Number of samples purchased and taken	
Number of samples delivered to chemists	
Number of evenings obtaining samples	
Number of appearances in cases	
Number of complaints made	
Number of hotels, restaurants and boarding-houses visited..	
Number of stores inspected	18
Estimated number of miles traveled	740

Thomas R. Gray, expert, employed in the above service fifty-eight days:

Number of days in court	9
Number of days obtaining evidence	5
Number of days inspecting stores	20
Number of days visiting hotels, restaurants and boarding-houses	23
Number of days on special duty	1

Total number of days	58
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Number of samples purchased and taken	206
Number of samples delivered to chemists.....	5
Number of evenings obtaining samples.....	6
Number of appearances in cases.....	9
Number of complaints made	5
Number of hotels, restaurants and boarding-houses visited,	175
Number of stores inspected.....	320
Estimated number of miles traveled.....	1,650

Archiebald D. Clark, expert, employed in the above service 182 days:

Number of days in court.....	63
Number of days obtaining evidence.....	20
Number of days on special duty.....	16
Number of days inspecting stores.....	42
Number of days visiting hotels, restaurants and boarding-houses	41
Total number of days	182

Number of samples purchased and taken.....	813
Number of samples delivered to chemists.....	22
Number of evenings obtaining samples.....	37
Number of appearances in cases.....	177
Number of complaints made.....	21
Number of hotels, restaurants and boarding-houses visited,	889
Number of stores inspected	1,786
Estimated number of miles traveled	6,005

William W. Meeteer, expert, employed in the above service 157 days:

Number of days in court	51
Number of days obtaining evidence	7
Number of days inspecting stores	57
Number of days on special duty	
Number of days visiting hotels, restaurants and boarding-houses	42
Total number of days	157

Number of samples purchased and taken	755
Number of samples delivered to chemists	26
Number of evenings obtaining samples	79
Number of appearances in cases	155
Number of complaints made	26

Number of hotels, restaurants and boarding-houses visited,	951
Number of stores inspected	1,994
Estimated number of miles traveled	5,485

John McGuire, expert, employed in the above service fifty-two days:

Number of days in court	2
Number of days obtaining evidence	3
Number of days inspecting stores	33
Number of days on special duty	
Number of days visiting hotels, restaurants and boarding-houses	14

Total number of days 52

Number of samples purchased and taken	152
Number of samples delivered to chemists	2
Number of evenings obtaining samples	10
Number of appearances in cases	3
Number of complaints made	1
Number of hotels, restaurants and boarding-houses visited,	175
Number of stores inspected	2,023
Estimated number of miles traveled	1,741

J. T. Norton, expert, employed in the above service sixty-four days:

Number of days in court.....	2
Number of days obtaining evidence.....	12
Number of days inspecting stores.....	35
Number of days on special duty.....	6
Number of days visiting hotels, restaurants and boarding-houses	9

Total number of days..... 64

Number of samples purchased and taken.....	45
Number of samples delivered to chemists.....	1
Number of evenings obtaining samples.....	11

Number of appearances in cases.....	
Number of complaints made.....	
Number of hotels, restaurants and boarding-houses visited,	68
Number of stores inspected.....	903
Estimated number of miles traveled.....	2,275

T. C. Du Bois, expert, employed in the above service thirty-five days:

Number of days in court.....	3
Number of days obtaining evidence.....	2
Number of days on special duty.....	5
Number of days inspecting stores.....	6
Number of days visiting hotels, restaurants and boarding-houses	9
Total number of days.....	25

Number of samples purchased and taken.....	30
Number of samples delivered to chemists.....	1
Number of evenings obtaining samples.....	
Number of complaints made.....	1
Number of appearances in cases.....	5
Number of stores inspected	105
Number of hotels, restaurants and boarding-houses visited,	30
Miles traveled	450

Joseph F. Geisler, Ph. C.:

Number of analyses of oleomargarine and butter samples..	31
Number of appearances in cases	57
Number of days in court	34

Edward G. Love, Ph. D.:

Number of analyses of oleomargarine and butter samples..	10
Number of appearances in cases	24
Number of days in court	19

Chas. M. Stillwell, A. M., and Thomas S. Gladding, A. M.:

Number of analyses of oleomargarine and butter samples..	22
Number of appearances in cases	67
Number of days in court	40

Geo. W. Roderick, counsel:

Number of cases prosecuted	4
Number of cases disposed of	4
Number of convictions	4
Number of appearances in cases	9
Number of days in court	5

Francis V. S. Oliver, counsel:

Number of cases prosecuted	3
Number of cases disposed of	3
Number of convictions	2
Number of cases dismissed	1
Number of appearances in cases	9
Number of days in court	6

Cook & Salmon, counsel:

Number of cases prosecuted	4
Number of cases disposed of	4
Number of convictions	4
Number of acquittals	
Number of appearances in cases	10
Number of days in court	7

Charles D. Olendorf, counsel:

Number of cases prosecuted	16
Number of cases disposed of	16
Number of convictions	15
Number of cases dismissed	1
Number of appearances in cases	42
Number of days in court	29

E. S. Healy, counsel:

Number of cases prosecuted	3
Number of cases disposed of .....	.
Number of convictions .....	...
Number of acquittals .....	.....
Number of appearances in cases	12
Number of days in court	6

John M. Coman, counsel:

Number of cases prosecuted	12
Number of cases disposed of	12
Number of convictions	8
Number of cases dismissed	4
Number of appearances in cases	26
Number of days in court	17

J. J. Marrin, counsel:

Number of cases prosecuted	12
Number of cases disposed of	12
Number of convictions	7
Number of cases dismissed	5
Number of appearances in cases	27
Number of days in court	15

Total of Work Performed (Oleomargarine).

Number of days (experts)	674
Number of days in court, experts, counsel and chemists,	325
Number of days obtaining evidence	83
Number of days on special duty	32
Number of days inspecting stores	212
Number of days visiting hotels, restaurants and boarding-houses	179
Number of samples purchased and taken	2,307
Number of samples delivered to chemists	63
Number of evenings obtaining samples	143
Number of appearances in cases	659
Number of complaints made	57

Number of stores inspected	8,203.
Number of hotels, restaurants and boarding-houses visited	2,685
Estimated number of miles traveled	20,371
Number of analyses of oleomargarine and butter samples,	63
Number of cases prosecuted	57
Number of cases disposed of	53
Number of convictions	41
Number of cases dismissed from calendar	11
Number of cases dismissed (defendant deceased).....	1
Number of cases dismissed (defendant absconded).....	1
Number of cases awaiting trial	3
Amount of fines imposed	<u>\$2,250</u>

PROSECUTIONS.

Oleomargarine.

The status of the following prosecution for violation of the oleomargarine law was fully reported to you in my eighth annual report. The final disposition of it is given below:

Case No. 1265. The People v. Walsh. Called for trial October 7, 1891. Court, Oyer and Terminer. White Plains. Pleaded guilty. Sentence suspended.

The following statement represents prosecutions commenced during the year ending September 30, 1892, under chapter 183, Laws of 1885, as amended by chapter 577, Laws of 1886, and by chapter 583, Laws of 1887, relating to the sale of oleomargarine and the present status of the cases:

CASE No. 572-G.

THE PEOPLE v. COPLE.

Tombs Police Court, New York City.

Warrant issued January 18, 1892; answered to January 18, 1892; adjourned to January twentieth; held to bail for trial at Special Sessions. Called for trial January 25, 1892. Tried, convicted; fined fifty dollars.

Counsel, Chas. D. Olendorf.

Witnesses: T. R. Gray, E. S. Wilson, and chemist, C. M. Stillwell.

CASE No. 1271-H.

THE PEOPLE v. BRENNAN.

Tombs Police Court, New York City.

Warrant issued December 30, 1891; answered to December thirty-first; held to bail for trial at Special Sessions. Called for trial January 11, 1892; adjourned to January twenty-fifth. Tried, convicted; fined fifty dollars.

Counsel, C. D. Olendorf.

Witnesses: Wm. W. Meeteer, Arch. D. Clark, and chemist, C. M. Stillwell.

CASE No. 571-G.

THE PEOPLE v. MOON.

Justice Tighe's Police Court, Brooklyn, N. Y.

Warrant issued December 24, 1891; answered to December thirty-first; adjourned to January 7, 1892. Pleaded guilty; fined fifty dollars.

Counsel, A. C. Salomon.

Witnesses: Thomas R. Gray, E. S. Wilson, and chemist, Charles M. Stillwell.

CASE No. 494-F.

THE PEOPLE v. WHEELLOCK.

Justice Tighe's Police Court, Brooklyn, N. Y.

Warrant issued December 31, 1891; adjourned to January 7, 1892. Pleaded guilty; fined fifty dollars.

Counsel, A. C. Salomon.

Witnesses: E. S. Wilson, T. R. Gray, and chemist, Joseph F. Geisler.

CASE No. 574-G.

THE PEOPLE v. NICHOLAS.

Tombs Police Court, New York City.

Warrant issued January 18, 1892; answered to January eighteenth; held to bail for trial at Special Sessions. Called for trial January 25, 1892. Tried, convicted; fined fifty dollars.

Counsel, Chas. D. Olendorf.

Witnesses: T. R. Gray, E. S. Wilson, and chemist, J. F. Geisler.

CASE No. 1102-K.

THE PEOPLE v. BYRNES.

Yorkville Police Court, New York City.

Warrant issued January 25, 1892; answered to January twenty-fifth; adjourned to January twenty-sixth, to January thirtieth, and held to bail for trial at Special Sessions. Called for trial February eighth; adjourned to February twenty-sixth, and pleaded guilty; fined \$100.

Counsel, Chas. D. Olendorf.

Witnesses, Arch D. Clark, W. W. Meeteer, and chemist, J. F. Geisler.

CASE No. 573-G.

THE PEOPLE v. PELL.

Tombs Police Court, New York City.

Warrant issued January 18, 1892; answered to January 18, 1892; held to bail for trial at Special Sessions. Called for trial January 25, 1892. Tried, convicted; fined fifty dollars.

Counsel, Chas. D. Olendorf.

Witnesses: Thos. R. Gray, E. S. Wilson, and chemist, O. M. Stillwell.

CASE No. 495-F.

THE PEOPLE *v.* GROLI*Tombs Police Court, New York City.*

Warrant issued January 22, 1892; answered to January twenty-third; held to bail for trial at Special Sessions. Called for trial February first. Tried, convicted; fined fifty dollars.

Counsel, Chas. D. Olendorf.

Witnesses: E. S. Wilson, T. R. Gray, and chemist, J. F. Geisler.

CASE No. 1096-K.

THE PEOPLE *v.* PLUMB.*Harlem Police Court, New York City.*

Warrant issued January 28, 1892; answered to February first; held to bail for trial at General Sessions. Before grand jury February 26, 1892; indicted, case transferred to Special Sessions. Called for trial April 25, 1892. Pleaded guilty; fined \$100.

Counsel, John M. Coman.

Witnesses: Arch. D. Clark, W. W. Meeteer, and chemist, Joseph F. Geisler.

CASE No. 1272-H.

THE PEOPLE *v.* REEVES.*Harlem Police Court, New York City.*

Warrant issued January 27, 1892; answered to February first; held to bail for trial at Special Sessions. Called for trial February eighth; adjourned to twenty-fourth, to March second, and pleaded guilty; fined fifty dollars.

Counsel, F. V. S. Oliver.

Witnesses: W. W. Meeteer, Arch. D. Clark, and chemist, A. M. Stillwell.

CASE No. 1097-K.

THE PEOPLE *v.* ELLIOTT.

Harlem Police Court, New York City.

Warrant issued January 28, 1892; answered to February first; held to bail for trial at Special Sessions. Called for trial February eighth; adjourned to twenty-fourth. Tried, convicted; fined fifty dollars.

Counsel, John M. Coman.

Witnesses: Arch. D. Clark, W. W. Meeteer, and chemist, C. M. Stillwell.

CASE No. 1098-K.

THE PEOPLE *v.* GALLAGER.

Harlem Police Court, New York City.

Warrant issued January 28, 1892; answered to February second; held to bail for trial at Special Sessions. Called for trial February eighth; adjourned to twenty-fourth. Tried, convicted; fined fifty dollars.

Counsel, John M. Coman.

Witnesses: Arch. D. Clark, W. W. Meeteer, and chemist, C. M. Stillwell.

CASE No. 1105-K.

THE PEOPLE *v.* MEYER.

Tombs Police Court, New York City.

Warrant issued May 26, 1892; answered to May twenty-seventh; held to bail for trial at Special Sessions. Called for trial June 6, 1892; adjourned to June thirteenth. Pleaded guilty; fined fifty dollars.

Counsel, Chas. D. Olendorf.

Witnesses: Arch. D. Clark, W. W. Meeteer, and chemist, J. F. Geisler.

CASE No. 496-F.

THE PEOPLE *v.* PAYNE.*Tombs Police Court, New York City.*

Warrant issued February 2, 1892; answered to February second; held to bail for trial at Special Sessions. Called for trial February 11, 1892. Tried, convicted; fined fifty dollars.

Counsel, C. D. Olendorf.

Witnesses: E. S. Wilson, T. R. Gray, and chemist, J. F. Geisler.

CASE No. 1099-K.

THE PEOPLE *v.* KABISCH.*Yorkville Police Court, New York City.*

Warrant issued February 10, 1892; answered to February eleventh; held to bail for trial at Special Sessions. Called for trial February seventeenth; adjourned to twenty-fourth, and pleaded guilty; fined fifty dollars.

Counsel, Chas. D. Olendorf.

Witnesses: Arch. D. Clark, W. W. Meeteer, and chemist, Joseph F. Geisler.

CASE No. 1100-K.

THE PEOPLE *v.* McCARTHY.*Yorkville Police Court, New York City.*

Warrant issued February 10, 1892; answered to February eleventh; held to bail for trial at Special Sessions. Called for trial February 17, 1892. Plead guilty; fined fifty dollars.

Counsel, Chas. D. Olendorf.

Witnesses: Arch. D. Clark, W. W. Meeteer, and chemist, J. F. Geisler.

CASE No. 1274-H.

THE PEOPLE v. STAFFORD.

Harlem Police Court, New York City.

Warrant issued January 27, 1892; answered to January twenty-ninth; adjourned to February first; held to bail for trial at General Sessions. Before grand jury April nineteenth, indicted; case transferred to Special Sessions. Called for trial April twenty-fifth; adjourned to May second, and discharged by the court on account of technical error in printed form of complaint.

Counsel, F. V. S. Oliver.

Witnesses: Wm. W. Meeteer, Arch. D. Clark, and chemist, C. M. Stillwell.

CASE No. 1275-H.

THE PEOPLE v. ROHRBERG.

Jefferson Market Police Court, New York City.

Warrant issued January 29, 1892; answered to January twenty-ninth; adjourned to January thirty-first, to February fourth. Held for trial at Special Sessions. Called for trial February tenth. Tried, convicted; fined fifty dollars.

Counsel, Chas. D. Olendorf.

Witnesses: Wm. W. Meeteer, Arch. D. Clark, and chemist, C. M. Stillwell.

CASE No. 1273-H.

THE PEOPLE v. GOONAN.

Harlem Police Court, New York City.

Warrant issued January 27, 1892; answered to February first; held to bail for trial at General Sessions. Before grand jury April nineteenth; indicted; case transferred to Special Sessions. Called for trial April twenty-fifth; adjourned to May second. Pleaded guilty; fined \$100.

Counsel, F. V. S. Oliver.

Witnesses: Wm. W. Meeteer, Arch. D. Clark, and chemist, C. M. Stillwell.

CASE No. 1276-H.

THE PEOPLE v. HOFFMAN,

Jefferson Market Police Court, New York City.

Warrant issued January 28, 1892; answered to January twenty-ninth; adjourned to thirty-first, to February fourth and discharged. Counsel, Chas. D. Olendorf.

Witnesses: Wm. W. Meeteer, Arch. D. Clark, and chemist, C. M. Stillwell.

CASE No. 1279-H.

THE PEOPLE v. PUKL.

Yorkville Police Court, New York City.

Warrant issued February 25, 1892; answered to February twenty-seventh; held to bail for trial at Special Sessions. Called for trial at Special Sessions March 3, 1892. Tried, convicted; fined fifty dollars.

Counsel, Joseph J. Marrin.

Witnesses: W. W. Meeteer, Arch. D. Clark, and chemist, C. M. Stillwell.

CASE No. 1280-H.

THE PEOPLE v. LEE.

Yorkville Police Court, New York City.

Warrant issued March 8, 1892; answered to March twelfth; held to bail for trial at Special Sessions. Called for trial March sixteenth. Plead guilty; fined fifty dollars.

Counsel, Joseph J. Marrin.

Witnesses: W. W. Meeteer, Arch. D. Clark, and chemist, E. G. Love.

CASE No. 575-G.

THE PEOPLE v. LOHRBERG.

Tombs Police Court, New York City.

Warrant issued February 6, 1892; answered to February 7, 1892; held for trial at Special Sessions. Called for trial February 17, 1892. Pleaded guilty; fined fifty dollars.

Counsel, Chas. D. Olendorf.

Witnesses: Thos. R. Gray, E. S. Wilson, and chemist, Joseph F. Geisler.

CASE No. 1101-K.

THE PEOPLE v. SCHARNINGHAUS.

Harlem Police Court, New York City.

Warrant issued March 3, 1892; answered to March fourth; held to bail for trial at Special Sessions. Called for trial March 10, 1892. Pleaded guilty; fined fifty dollars.

Counsel, John M. Coman.

Witnesses: Arch. D. Clark, W. W. Mecteer, and chemist, E. G. Love.

CASE No. 1103-K.

THE PEOPLE v. KUSY.

Harlem Police Court, New York City.

Warrant issued March 3, 1892; answered to March seventh; held to bail for trial at Special Sessions. Called for trial March fourteenth, and case discharged by the court on account of a technical error in printed form of complaint.

Counsel, John M. Coman.

Witnesses: Arch. D. Clark, W. W. Meeteer, and chemist, C. M. Stillwell.

CASE No. 1282-H.

THE PEOPLE v. SULLIVAN.

Tombs Police Court, New York City.

Warrant issued March 2, 1892; answered to March third; held to bail for trial at Special Sessions. Called for trial March tenth; adjourned to fourteenth, and pleaded guilty; fined fifty dollars. After which was discharged by the court on account of technical error in printed form of complaint.

Counsel, Joseph J. Marrin.

Witnesses: W. W. Meeteer, Arch. D. Clark, and chemist, E. G. Love.

CASE No. 1277-H.

THE PEOPLE v. HIRST.

Yorkville Police Court, New York City.

Warrant issued February '25, 1892; answered to February twenty-seventh; held to bail for trial at Special Sessions. Called for trial March seventh; adjourned to fourteenth and tried. Convicted; fined fifty dollars. After which was discharged by the court on account of technical error in printed form of complaint.

Counsel, Joseph J. Marrin.

Witnesses: W. W. Meeteer, Arch. D. Clark, and chemist, E. G. Love.

CASE No. 1278-H.

THE PEOPLE v. HAYES.

Yorkville Police Court, New York City.

Warrant issued February 25, 1892; answered to February twenty-seventh; held to bail for trial at Special Sessions. Called for trial March seventh; adjourned to March fourteenth. Pled guilty; fined fifty dollars. After which was discharged by the court on account of technical error in printed form of complaint.

Counsel, Joseph J. Marrin.

Witnesses: W. W. Meeteer, Arch. D. Clark, and chemist, Joseph F. Geisler.

CASE No. 1109-K.

THE PEOPLE v. CORMIER.

Harlem Police Court, New York City.

Warrant issued March 3, 1892; answered to March eighth; held to bail for trial at Special Sessions. Called for trial March 14, 1892. Pleaded guilty; fined fifty dollars. After which was discharged by court on account of alleged technical error in printed form of complaint.

Counsel, John M. Coman.

Witnesses: Arch. D. Clark, W. W. Meeteer, and chemist, J. F. Geisler.

CASE No. 1112-K.

THE PEOPLE v. SEBELLE.

Harlem Police Court, New York City.

Warrant issued March 3, 1892; answered to March sixth; held to bail for trial at Special Sessions. Called for trial March 14, 1892. Pleaded guilty; fined fifty dollars. After which was discharged by the court on account of alleged technical error in printed form of complaint.

Counsel, John M. Coman.

Witnesses: Arch. D. Clark, W. W. Meeteer, and chemist, Joseph F. Geisler.

CASE No. 1286-H.

THE PEOPLE v. CARROLL.

Tombs Police Court, New York City.

Warrant issued March 2, 1892; answered to March third; adjourned to March fifth for examination; held to bail for trial at Special Sessions. Called for trial March tenth; adjourned to fourteenth, and pleaded guilty; fined fifty dollars. After which was discharged by the court on account of a technical error in printed form of complaint.

Counsel, Joseph J. Marrin.

Witnesses: W. W. Meeteer, Arch. D. Clark, and chemist, Chas. M. Stillwell.

CASE No. 1108-K.

THE PEOPLE v. CLEARWATER.

Harlem Police Court, New York City.

Warrant issued March 3, 1892; answered to March eighth; held to bail for trial at Special Sessions. Called for trial March fourteenth. Pleaded guilty; fined fifty dollars. After which was discharged by the court on account of a technical error in printed form of complaint.

Counsel, John M. Coman.

Witnesses: Arch. D. Clark, W. W. Meeteer, and chemist, C. M. Stillwell.

CASE No. 1106-K.

THE PEOPLE v. WEBB.

Tombs Police Court, New York City.

Warrant issued May 26, 1892; answered to May twenty-eighth; held to bail for trial at Special Sessions. Called for trial June sixth; adjourned to thirteenth, to June fifteenth, and pleaded guilty; fined fifty dollars.

Counsel, Chas. D. Olendorf.

Witnesses: Arch. D. Clark, W. W. Meeteer, and chemist, Joseph F. Geisler.

CASE No. 1283-H

THE PEOPLE v. RADEMACHER.

Tombs Police Court, New York City.

Warrant issued March 2, 1892; answered to March third; held to bail for trial at Special Session. Called for trial March tenth. Pleaded guilty; fined fifty dollars.

Counsel, Joseph J. Marrin.

Witnesses: W. W. Meeteer, Arch. D. Clark, and chemist, Joseph F. Geisler.

CASE No. 1281-H.

THE PEOPLE v. BIGLEY.

Yorkville Police Court, New York City.

Warrant issued February 25, 1892; answered to February twenty-seventh; held to bail for trial as Special Session. Called for trial March 7, 1892. Tried, convicted; fined fifty dollars.

Counsel, Joseph J. Marrin.

Witnesses: W. W. Meeteer, Arch. D. Clark, and chemist, J. F. Geisler.

CASE No. 1104-K.

THE PEOPLE v. STAHLER.

Harlem Police Court, New York City.

Warrant issued May 18, 1892; answered to May twentieth; held to bail for trial at Special Sessions. Called for trial May 25, 1892. Pled guilty; fined fifty dollars.

Counsel, John M. Coman.

Witnesses: Arch. D. Clark, W. W. Meeteer, and chemist, J. F. Geisler.

CASE No. 1287-H.

THE PEOPLE v. MILLER.

Tombs Police Court, New York City.

Warrant issued March 2, 1892; answered to March third; held to bail for trial at Special Sessions. Called for trial March tenth. Tried, convicted; fined fifty dollars.

Counsel, Joseph J. Marrin.

Witnesses: W. W. Meeteer, Arch. D. Clark, and chemist, C. M. Stillwell.

CASE No. 1110-K.

THE PEOPLE *v.* WEINERS.*Harlem Police Court, New York City.*

Warrant issued March 3, 1892; answered to March tenth; held to bail for trial at Special Sessions. Called for trial, April 25, 1892. Pleaded guilty; fined fifty dollars.

Counsel, John M. Coman.

Witnesses: Arch. D. Clark, W. W. Meeteer, and chemist, J. F. Geisler.

CASE No. 1284-H.

THE PEOPLE *v.* WENTE.*Yorkville Police Court, New York City.*

Warrant issued, March 8, 1892; answered to March twelfth; held to bail for trial at Special Sessions. Called for trial April twenty-fifth; adjourned to May second; to fourth and pleaded guilty; fined fifty dollars.

Counsel, Joseph J. Marrin.

Witnesses: W. W. Meeteer, Arch. D. Clark.

CASE No. 1285-H.

THE PEOPLE *v.* RIELLY.*Yorkville Police Court, New York City.*

Warrant issued March 8, 1892; answered to March nineteenth and complaint withdrawn.

Counsel, Joseph J. Marrin.

Witnesses: W. W. Meeteer, A. D. Clark, and chemist, E. G. Love.

CASE No. 1288-H.

THE PEOPLE v. FOX.

Harlem Police Court, New York City.

Warrant issued May 18, 1892; answered to May twentieth; held to bail for trial at Special Sessions. Called for trial May 25, 1892. Tried, convicted; fined fifty dollars.

Counsel, John M. Coman.

Witnesses: W. W. Meeteer, Arch. D. Clark, and chemist, E. G. Love.

CASE No. 1290-H.

THE PEOPLE v. LOCKWOOD.

Justice Tighe's Police Court, Brooklyn, N. Y.

Warrant issued May 11, 1892; answered to May 13, 1892. Pleaded guilty; fined fifty dollars.

Counsel, A. C. Salmon.

Witnesses: W. W. Meeteer, Arch. D. Clark, and chemist, C. M. Stillwell.

CASE No. 51-J.

THE PEOPLE v. POFF.

Essex Market Police Court, New York City.

Warrant issued February 27, 1892; answered to February twenty-ninth; held to bail for trial at Special Sessions. Called for trial March 10, 1892. Tried, convicted; fined fifty dollars.

Counsel, Chas. D. Olendorf.

Witnesses: T. C. DuBois, E. S. Wilson, and chemist, J. F. Geisler.

CASE No. 1289-H.

THE PEOPLE v. SCHROPP.

Tombs Police Court, New York City.

Warrant issued May 17, 1892; answered to May nineteenth; held to bail for trial at Special Sessions. Called for trial May twenty-fifth. Tried, convicted; fined fifty dollars.

Counsel, Joseph J. Marrin.

Witnesses: W. W. Meeteer, A. D. Clark, and chemist, J. F. Geisler.

CASE No. 1114-K.

THE PEOPLE v. THOMPSON.

Tombs Police Court, New York City.

Warrant issued May 16, 1892. Defendant died before case came to trial.

Counsel, Chas. D. Olendorf.

Witnesses: Arch. D. Clark, W. W. Meeteer, and chemist, F. G. Love.

CASE No. 1291-H.

THE PEOPLE v. LOOKWOOD.

Justice Tighe's Police Court, Brooklyn, N. Y.

Warrant issued May 11, 1892; answered to May thirteenth; adjourned to sixteenth, to twentieth, to twenty-seventh, to June sixth, to tenth, and pleaded guilty; fined fifty dollars.

Counsel, Chas. D. Olendorf.

Witnesses: W. W. Meeteer, Arch. D. Clark, and chemist, Chas. M. Stillwell.

CASE No. 1115-K.

THE PEOPLE v. BOYER.

Harlem Police Court, New York City.

Warrant issued May 18, 1892; answered to May twentieth; held to bail for trial at Special Sessions. Called for trial May 25, 1892. Tried, convicted; fined fifty dollars.

Counsel, John M. Coman.

Witnesses: Arch. D. Clark, W. W. Meeteer, and chemist, J. F. Geisler.

CASE No. 1113-K.

THE PEOPLE v. BECK.

Justice Baird's City Court, Mount Vernon, N. Y.

Warrant issued June 17, 1892; answered to June twentieth. Pled guilty; fined fifty dollars.

Witnesses: Arch. D. Clark, W. W. Meeteer, and chemist, J. F. Geisler.

CASE No. 1116-K.

THE PEOPLE v. HERSELSON.

Justice Sutherland's Police Court, Coney Island, N. Y.

Warrant issued July 13, 1892; answered to July fourteenth, adjourned to nineteenth, to twenty-second, to twenty-sixth, and pleaded guilty; fined fifty dollars.

Counsel, George W. Roderick.

Witnesses: Arch. D. Clark, W. W. Meeteer, and chemist, Joseph F. Geisler.

CASE No. 1117-K.

THE PEOPLE *v.* O'BRIEN.*Justice Sutherland's Police Court, Coney Island, N. Y.*

Warrant issued July 22, 1892; answered to July twenty-sixth, and pleaded guilty; fined fifty dollars.

Counsel, George W. Roderick.

Witnesses: Arch. D. Clark, W. W. Meeteer, and chemist, J. F. Geisler.

CASE No. 1292-H.

THE PEOPLE *v.* DOYLE.*Justice Sutherland's Police Court, Coney Island, N. Y.*

Warrant issued July 13, 1892; answered to July fourteenth. Pled guilty; fined fifty dollars.

Counsel, George W. Roderick.

Witnesses: W. W. Meeteer, Arch. D. Clark, and chemist, C. M. Stillwell.

CASE No. 1293-H.

THE PEOPLE *v.* STAUCH.*Justice Sutherland's Police Court, Coney Island, N. Y.*

Warrant issued July 22, 1892; answered to July twenty-sixth, and pleaded guilty; fined fifty dollars.

Counsel, George W. Roderick.

Witnesses: W. W. Meeteer, Arch. D. Clark, and chemist, C. M. Stillwell.

CASE No. 1294-H.

THE PEOPLE *v.* KRUSE.*Justice Smith's Police Court, Rockaway Beach, N. Y.*

Warrant issued July 27, 1892; answered to July twenty-ninth, and adjourned to August third, to September second, to September twenty-sixth, and to October nineteenth, 1892.

Counsel, Edmund J. Healy.

Witnesses: W. W. Meeteer, Arch. D. Clark, and chemist, C. M. Stillwell.

CASE No. 1295-H.

THE PEOPLE v. SEAMAN.

Justice Smith's Police Court, Rockaway Beach, N. Y.

Warrant issued July 27, 1892; answered to July 29, 1892; adjourned to August third, to September fifth, to twenty-sixth and to October 17, 1892.

Counsel, Edmund J. Healy.

Witnesses: W. W. Meeteer, Arch. D. Clark, and chemist, C. M. Stillwell.

CASE No. 1296-H.

THE PEOPLE v. MORRISON.

Justice Smith's Police Court, Rockaway Beach, N. Y.

Warrant issued July 27, 1892; answered to July twenty-ninth; adjourned to August third, to September second, to twenty-sixth and to October 17, 1892.

Counsel, Edmund J. Healy.

Witnesses: W. W. Meeteer, Arch. D. Clark, and chemist, J. F. Geisler.

CASE No. 46.

THE PEOPLE v. CREISCA.

Jefferson Market Police Court, New York City.

Warrant issued September 1, 1892; answered to September second; held to bail for trial at Special Sessions. Called for trial September 30, 1892. Tried, convicted; fined fifty dollars.

Counsel, Chas. D. Olendorf.

Witnesses: John McGuire, E. S. Wilson, and chemist, Joseph F. Geisler.

CASE No. 1107-K.

THE PEOPLE *v.* CZERVONKA.*Harlem Police Court, New York City.*

Warrant issued March third. Party absconded before service of warrant.

Counsel, J. M. Coman.

Witnesses: Arch. D. Clark, W. W. Meeteer, and chemist, E. G. Love.

The result of the fifty-seven preceding prosecutions for violations of the oleomargarine law commenced between September 30, 1891, and October 1, 1892, were as follows:

Convicted on trial or pleaded guilty.....	41
Dismissed from calendar	11
Deceased	1
Awaiting trial	3
Absconded	1
	<hr/>
Total	57
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Fines imposed	\$2,250
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The increased service required to look after oleomargarine has made it impossible for me to give as much attention to the inspection of milk as the interest of the consumers required. Still the effect of the vigorous prosecutions of those that violated the laws relating to the sale of adulterated milk during the previous year had the effect of keeping the adulteration of milk by dealers down to nearly if not quite as low a percentage as usual, but should the same condition continue another year there will, without doubt, be more violations of the dairy laws than during this year, unless the force of experts are increased to a considerable extent which, I am well aware, cannot be done without a larger appropriation is made.

Detailed Report of Work Performed (Milk).

The following tables give a detailed report of work performed by each employe in this division of the department between September 30, 1891, and October 1, 1892, in enforcing the laws relating to the sale of adulterated milk:

William W. Meeteer, expert, employed in the above service eighty-five days:

Number of days in court.....	7
Number of days inspecting milk.....	64
Number of days obtaining evidence.....	3
Number of days inspecting herds.....	11

Total number of days.....	85
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Number of creamerymen's milk inspected.....	58
Number of stores inspected.....	1,550
Number of dairies' milk inspected at creameries and rail-road depots	750
Number of peddlers' milk inspected.....	360
Number of inspections of stables.....	168
Number of cows inspected	8,801
Total number of milk inspections.....	9,682
Total number of samples delivered to chemists.....	9
Total number of complaints made.....	7
Total number of appearances in cases.....	33
Estimated number of miles traveled.....	3,940

Edmund S. Wilson, expert, employed in the above service 132 days:

Number of days in court	19
Number of days inspecting milk	77
Number of days obtaining evidence	32
Number of days on special duty	2
Number of days inspecting herds	2

Total number of days	132
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Number of creamerymen's milk inspected	44
Number of dairies' milk inspected on delivery at creameries and railroad depots	666
Number of stores inspected	2,511
Number of peddlers' milk inspected	258
Number of inspections of stables	20
Number of cows inspected	750
Total number of milk inspections	9,507
Total number of samples delivered to chemists	7
Total number of complaints made	6
Total number of appearances in cases	31
Estimated number of miles traveled	4,558

Thomas R. Gray, expert, employed in the above service twenty-eight days:

Number of days in court	4
Number of days inspecting milk	18
Number of days obtaining evidence	3
Number of days on special duty	3
Number of days inspecting herds	

Total number of days	28
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Number of creamerymen's milk inspected	
Number of stores inspected	236
Number of dairies' milk inspected on delivery at creameries and railroad depots	
Number of peddlers' milk inspected	10
Number of inspections of stables	
Number of cows inspected	
Total number of milk inspections	635
Total number of samples delivered to chemists	2
Total number of complaints made	
Total number of appearances in cases	6
Estimated number of miles traveled	965

Joseph J. Sorogan, expert, employed in the above service thirty days:

Number of days in court	4
Number of days inspecting milk	6
Number of days special duty	8
Number of days obtaining evidence	10
Number of days inspecting herds	2

Total number of days	<u>30</u>
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Number of stores inspected	118
Number of dairies' milk inspected on delivery at creameries and railroad depots	
Number of peddlers' milk inspected	12
Total number of milk inspections	306
Total number of samples delivered to chemists	
Total number of stables inspected	6
Total number of complaints	
Total number cans inspected	82
Total number of appearances in cases	4
Estimated number of miles traveled	<u>1,240</u>

Archibald D. Clark, expert, employed in the above service eighty-five days:

Number of days in court	8
Number of days inspecting milk	44
Number of days obtaining evidence	17
Number of days on special duty	14
Number of days inspecting herds	2

Total number of days	<u>85</u>
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Number of creamerymen's milk inspected	51
Number of stores inspected	1,350
Number of dairies' milk inspected on delivery at creameries and railroad depots	700
Number of inspections of stables	47
Number of cows inspected	1,151

Number of peddlers' milk inspected	299
Total number of milk inspections	8,142
Total number of samples delivered to chemists	2
Total number of complaints made	
Total number of appearances in cases	12
Estimated number of miles traveled	2,675

John McGuire, expert, employed in the above service seventy days:

Number of days in court	11
Number of days inspecting milk	52
Number of days obtaining evidence	3
Number of days on special duty	2
Number of days inspecting herds	2
Total number of days	<u>70</u>

Number of creamerymen's milk inspected	31
Number of stores inspected	1,867
Number of dairies' milk inspected on delivery at creameries and railroad depots	616
Number of inspections of stables	68
Number of cows inspected	1,032
Number of peddlers' milk inspected	219
Total number of milk inspections	7,428
Total number of samples delivered to chemists.....	5
Total number of complaints made	1
Total number of appearances in cases	17
Estimated number of miles traveled	<u>2,326</u>

John T. Norton, expert, employed in the above service seventy-one days:

Number of days in court	22
Number of days inspecting milk	41
Number of days obtaining evidence	
Number of days on special duty	
Number of days inspecting herds	5
Total number of days	<u>71</u>

Number of creamerymen's milk inspected	21
Number of stores inspected	873
Number of dairies' milk inspected on delivery at creameries and railroad depots	558
Number of inspections of stables	48
Number of cows inspected	2,583
Number of peddlers' milk inspected	159
Total number of milk inspections	7,295
Total number of complaints made	10
Total number of samples delivered to chemists.....	12
Total number of appearances in cases	39
Estimated number of miles traveled	2,480

Joseph F. Geisler, Ph. C.:

Number of analyses of milk samples	20
Number of appearances in cases.....	8
Number of days in court.....	7

Edward G. Love, Ph. D.:

Number of analyses of milk samples.....	5
Number of appearances in cases.....	15
Number of days in court.....	10

Charles M. Stillwell, A. M., and Thomas S. Gladding, A. M.:

Number of analyses of milk samples.....	13
Number of appearances in cases.....	16
Number of days in court.....	11

Arthur C. Salmon, counsel:

Number of cases prosecuted.....	4
Number of cases disposed of.....	4
Number of convictions.....	4
Number of acquittals.....	
Number of appearances in cases.....	14
Number of days in court.....	10

D. Olendorf, counsel:

of cases prosecuted.....	3
of cases disposed of.....	3
of convictions.....	2
of forfeited bail.....	1
of appearances in cases.....	6
of days in court.....	6

Total of Work Performed (Milk).

of days, experts.....	501
of days in court, experts, counsel and chemists....	119
of days inspecting milk.....	307
of days obtaining evidence.....	68
of days on special duty.....	29
of days inspecting herds.....	24
of milk inspections.....	42,995
of dairies' milk inspected.....	3,290
of stores inspected.....	8,505
of peddlars' milk inspected.....	1,295
of creamerymen's milk inspected.....	205
of stables inspected.....	358
of cows inspected.....	14,309
of samples delivered to chemists.....	38
of complaints made.....	24
of appearances in cases.....	201
of analyses of samples of milk.....	38
of cases prosecuted.....	24
of cases disposed of.....	23
of convictions.....	22
of cases bail forfeited.....	1
of cases not disposed of.....	1
of cases dismissed from calendar.....	
and number of miles traveled.....	18,284
of fines imposed in above cases.....	\$550

The status of the five following prosecutions for violation of the law relating to adulterated milk was fully reported to you in my eighth annual report, the present status of which is given in the following table:

Case No.	NAMES.	Called for trial.	Court.	Place.	Result.	Remarks.
1884	The People v. Memmerer.....	.....	General Sessions.....	New York.....	Indicted.....	Awaiting trial.
2777	The People v. Clancy.....	.....	General Sessions.....	Long Island City...	Indicted.....	Awaiting trial.
2545	The People v. Fedro.....	.....	General Sessions.....	New York.....	Indicted.....	Awaiting trial.
2586	The People v. Grundy.....	October 7, 1891	Special Sessions.....	Patchogue.....	Disagreement.....	.....
2548	The People v. Beaks.....	.....	General Sessions.....	New York.....	.....	Awaiting trial.

Prosecutions (Milk).

The following statement represents prosecutions during the year ending September 30, 1892, for violations of chapter 183, Laws of 1885, as amended by chapter 223, Laws of 1887, relating to adulterated milk and the present status of the cases:

CASE No. 2824.

THE PEOPLE v. MOONEY.

Justice Steinhart's Police Court, Hicksville, N. Y.

Warrant issued October 5, 1891; answered to October seventh; adjourned to October ninth and pleaded guilty.

Witnesses: E. S. Wilson, T. R. Gray, chemist, J. F. Geisler.

CASE No. 2826.

THE PEOPLE v. McCABE.

Justice Tice's Police Court, Brooklyn, N. Y.

Warrant issued December 24, 1891; answered to December thirty-first; adjourned to January 7, 1892. Pled guilty; fined twenty-five dollars.

Counsel, A. C. Salmon.

Witnesses: E. S. Wilson, T. R. Gray, chemist, J. F. Geisler.

CASE No. 3516.

THE PEOPLE v. MEYER.

Justice Goetting's Police Court, Brooklyn, N. Y.

Warrant issued April 20, 1892; answered to April twenty-second. Pled guilty; fined twenty-five dollars.

Witnesses: W. W. Meeteer, J. T. Norton, chemist. Thos. S. Gladding.

CASE No. 3517.

THE PEOPLE v. GRUHU.

Justice Goetting's Police Court, Brooklyn, N. Y.

Warrant issued April 20, 1892; answered to April twenty-second; adjourned to May sixth, to sixteenth, to twenty-sixth; tried by jury. Convicted; fined twenty-five dollars.

Counsel, A. C. Salmon.

Witnesses: W. W. Meeteer, J. T. Norton, chemist, C. M. Stillwell.

CASE No. 3527.

THE PEOPLE v. ROSS.

Justice Goetting's Police Court, Brooklyn, N. Y.

Warrant issued April 20, 1892; answered to April twenty-second. Pleaded guilty; fined twenty-five dollars.

Witnesses: W. W. Meeteer, J. T. Norton, chemist, E. G. Love.

CASE No. 2838.

THE PEOPLE v. TERPENING.

Justice Goetting's Police Court, Brooklyn, N. Y.

Warrant issued April 20, 1892; answered to April twenty-second. Pleaded guilty; fined twenty-five dollars.

Witnesses: W. W. Meeteer, J. T. Norton, chemist, J. F. Geisler.

CASE No. 2839.

THE PEOPLE v. IMHOFF.

Justice Goetting's Police Court, Brooklyn, N. Y.

Warrant issued April 22, 1892; answered to April twenty-sixth; adjourned to May second, to sixth, to May sixteenth. Pleaded guilty; fined twenty-five dollars.

Counsel, A. C. Salmon.

Witnesses: J. T. Norton, W. W. Meeteer, chemist, E. G. Love.

CASE No. 3514-K.**THE PEOPLE v. BREMER.***Justice Goetting's Police Court, Brooklyn, N. Y.*

Warrant issued April 22, 1892; answered to April twenty-sixth.
Pleaded guilty; fined twenty-five dollars.

Witnesses: John T. Norton, W. W. Meeteer, chemist, Thos. S. Gladding.

CASE No. 3528.**THE PEOPLE v. MOHRMANN.***Justice Connelly's Police Court, Brooklyn, N. Y.*

Warrant issued April 27, 1892; answered to April twenty-ninth;
Pleaded guilty; fined twenty-five dollars.

Witnesses: W. W. Meeteer, J. T. Norton, chemist, E. G. Love.

CASE No. 3524.**THE PEOPLE v. SCHUCHERT.***Justice Connelly's Police Court, Brooklyn, N. Y.*

Warrant issued April 27, 1892; answered to April twenty-ninth;
adjourned to May third. Pleaded guilty; fined twenty-five dollars.

Witnesses: W. W. Meeteer, J. T. Norton, chemist, C. M. Stillwell.

CASE No. 3530.**THE PEOPLE v. SCHULT.***Justice Goetting's Police Court, Brooklyn, N. Y.*

Warrant issued April 22, 1892; answered to April twenty-sixth.
Pleaded guilty; fined twenty-five dollars.

Witnesses: J. T. Norton, W. W. Meeteer, chemist, Thos. S. Gladding.

CASE No. 3525.

THE PEOPLE v. SCHLICHTING.

Justice Goetting's Police Court, Brooklyn, N. Y.

Warrant issued April 22, 1892; answered to April twenty-sixth; adjourned to May second, to sixth and to sixteenth. Pleaded guilty; fined twenty-five dollars.

Counsel, A. C. Salmon.

Witnesses: John T. Norton, W. W. Meeteer, chemist, E. G. Love.

CASE No. 3520.

THE PEOPLE v. SONDERMANN.

Justice Connelly's Police Court, Brooklyn, N. Y.

Warrant issued April 27, 1892; answered to May third and pleaded guilty; fined twenty-five dollars.

Witnesses: John T. Norton, W. W. Meeteer, chemist, J. F. Geisler.

CASE No. 3526.

THE PEOPLE v. SCHULTZ.

Justice Connelly's Police Court, Brooklyn, N. Y.

Warrant issued April 27, 1892; answered to May third and pleaded guilty; fined twenty-five dollars.

Witnesses: John T. Norton, W. W. Meeteer, chemist, C. M. Stillwell.

CASE No. 3521.

THE PEOPLE v. UFFELMANN.

Justice Connelly's Police Court, Brooklyn, N. Y.

Warrant issued April 27, 1892; answered to May 3, 1892, and pleaded guilty; fined twenty-five dollars.

Witnesses: John T. Norton, W. W. Meeteer, chemist, J. F. Geisler.

CASE No. 3515.

THE PEOPLE v. POPE.

Justice Connelly's Police Court, Brooklyn, N. Y.

Warrant issued April 27, 1892; answered to May third, and pleaded guilty; fined twenty-five dollars.

Witnesses: John T. Norton, W. W. Meeteer, chemist, Thos. S. Gladding.

CASE No. 2825.

THE PEOPLE v. FASTENAN.

Justice Tighe's Police Court, Brooklyn, N. Y.

Warrant issued May 3, 1892; answered to May fifth, and pleaded guilty; fined twenty-five dollars.

Witnesses: E. S. Wilson, John McGuire, chemist, Joseph F. Geisler.

CASE No. 2575.

THE PEOPLE v. MECKEL.

Essex Market Police Court, New York City.

Warrant issued August 23, 1892; answered to August 25, 1892; held to bail for trial at General Sessions.

Counsel, Chas. D. Olendorf.

Witnesses: E. S. Wilson, John McGuire, chemist, Joseph F. Geisler.

CASE No. 3519.

THE PEOPLE v. HEINSOHN.

Justice Connelly's Police Court, Brooklyn, N. Y.

Warrant issued April 27, 1892; answered to April twenty-ninth, and pleaded guilty; fined twenty-five dollars.

Witnesses: W. W. Meeteer, J. T. Norton, chemist, J. F. Geisler.

CASE No. 3529.

THE PEOPLE v. WIETERS.

Justice Connelly's Police Court, Brooklyn, N. Y.

Warrant issued April 27, 1892; answered to May third, and pleaded guilty; fined twenty-five dollars.

Witnesses: John T. Norton, W. W. Meeteer, chemist, E. G. Love.

CASE No. 2600.

THE PEOPLE v. REIDY.

Justice McKenna's Court, Whitestone, L. I.

Warrant issued September 12, 1892; answered to September nineteenth. Pled guilty; fined twenty-five dollars.

Witnesses: John McGuire, E. S. Wilson, chemist, J. F. Geisler.

CASE No. 2840.

THE PEOPLE v. BOOTH.

Jefferson Market Police Court, New York City.

Warrant issued September 14, 1892; answered to September 16, 1892; held to bail for trial at Special Sessions.

Witnesses: John T. Norton, John McGuire, chemist, J. F. Geisler. Geisler.

CASE No. 2601.

THE PEOPLE v. SCHROEDER,

Essex Market Police Court, New York City.

Warrant issued August twenty-third; answered to August twenty-fifth; held to bail for trial at Special Sessions. Called for trial September 30, 1892. Bail forfeited.

Counsel, Chas. D. Olendorf.

Witnesses: E. S. Wilson, John McGuire, chemist, Chas. M. Stillwell.

CASE No. 2856.

THE PEOPLE v. BRUMMER.

Essex Market Police Court, New York City.

Warrant issued August 23, 1892; answered to August twenty-fifth; held to bail for trial at Special Sessions. Called for trial September 30, 1892. Plead guilty; fined twenty-five dollars.

Counsel, Chas. D. Olendorf.

Witnesses: E. S. Wilson, John McGuire, chemist, J. F. Geisler.

The result of the twenty-four preceding prosecutions for violations of the milk law, commenced between September 30, 1891, and October 1, 1892, were as follows:

Convicted on trial or pleaded guilty	22
Awaiting trial at Special Sessions	1
Bail forfeited	1
	<hr/>
Total	24
	<hr/>
Total fines imposed	\$550
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Inspections (Milk).

During the month of August, an inspection of milk arriving over the different railroads and steamboats, for consumption in New York and Brooklyn, was made after the milk had been delivered by the common carriers to the grocers and peddlers. The plan adopted was, as usual, to obtain from the police department a detail of two or more officers for duty at each depot where inspected. With their assistance, the wagons were formed in line as they came off the ferries or from the railroad depots into the street. We then inspected the milk found on each wagon before allowing it to leave the line.

With the assistance of a detail of two experts from the third division of the dairy department and the entire force in this division, we were enabled, with the assistance of from four to six police officers kindly detailed for this duty by Acting

Superintendent of Police Thomas Byrnes, to cover all the points at which any one railroad delivered milk in one night, while on other nights we were able to inspect all milk delivered by two or more of the roads delivering only small quantities, thereby giving the milk arriving in the city a thorough inspection. The milk arriving over the New York and Northern railroad delivered at High Bridge station, comprising 950 cans, was inspected on the night of August eighth. The milk arriving over the New York and Harlem railroad, delivered at East Forty-eighth street and Lexington avenue, comprising 1,673 cans, was inspected on the night of August eleventh.

The milk arriving over the New York, Ontario and Western railroad, delivered at West Eleventh and West Forty-second street ferries, comprising 3,427 cans, was inspected on the night of August sixteenth.

The milk arriving over the New York, Susquehanna and Western railroad, delivered at Cortland and Desbrosses street ferries, comprising 1,496 cans, was inspected on the night of August seventeenth.

The milk arriving over the West Shore railroad, delivered at West Eleventh and West Forty-second street ferries, comprising 1,487 cans, was inspected on the night of August sixteenth.

The milk arriving over the Delaware, Lackawanna and Western railroad, delivered at Barclay and Christopher street ferries, comprising 4,742 cans, was inspected on the night of August twelfth.

The milk arriving over the Homer Ramsdell Transportation Company's boats, delivered at Franklin street and West One Hundred and Twenty-ninth street docks, comprising 964 cans, was inspected on the night of August thirteenth.

The milk arriving over the New York, Lake Erie and Western railroad, delivered at Chambers and Twenty-third street ferries, comprising 5,137 cans, was inspected on the night of August ninth.

The milk arriving over the New Jersey Central railroad at Liberty street ferry, comprising 193 cans, was inspected on the night of August seventeenth.

The milk arriving over the New York, New Haven and Hartford railroad, delivered at Montgomery street and One Hundred and Twenty-ninth street docks, comprising 381 cans, was inspected on the night of August thirteenth.

The milk inspected, when delivered by each railroad and steamboat line, represents one day's shipment over each line for consumption in New York and Brooklyn, to which must be added 600 cans average per day by miscellaneous conveyances.

The result of these inspections showed by the test applied that only a small percentage had been adulterated. The following statement will also show from what sections the milk is received in New York, to wit:

	Cans. milk.	Cans. cream
New York, Lake Erie and Western railroad....	5,137	251
New York and Harlem railroad	1,673	9
New York, Ontario and Western railroad	3,427	280
New York, Susquehanna and Western railroad .	1,496	31
New York and Northern railroad	950	.....
West Shore railroad	1,487	30
New York, New Haven and Hartford railroad..	381	5
Delaware, Lackawanna and Western railroad..	4,742	66
Homer Ramsdell Transportation Company	964	41
New Jersey Central railroad	193	6
Long Island railroad (estimated)	173	.....
Lehigh Valley railroad	242	3
Miscellaneous receipts by wagons (estimated)..	600	.....
	<hr/>	<hr/>
Total cans daily	21,465	722
	<hr/>	<hr/>

Average cans per day for September, 21,465.

The total number of dairies and creameries of milk represented by the above statement is 3,190.

The foregoing statement of inspections of milk on arrival in New York city, showed by the test applied, as compared with the two preceding years, a slight increase in the number of cans of milk that were of doubtful standard. The milk inspected during

the year, after it had reached the hands of the wholesale and retail dealers, has also shown an increased percentage of adulteration compared to the two preceding years. The increased adulteration shown has been light, but enough to fully demonstrate that the reduction in the number of State experts formerly employed in this division, and in the districts where milk for consumption in the cities is produced, has been observed by some of the producers and dealers in milk who have taken advantage of the fact and commenced to adulterate their goods to a greater extent than usual.

It is also a fact that a very large majority of producers of, and also of the dealers in, milk do not adulterate their goods and would not do so under any circumstances, yet there are a few of both producers and dealers that will adulterate milk whenever they think they can do so without being detected, consequently, it is very necessary that the State experts should make more frequent inspections than can be done with the limited force employed in this division of the department. There are nearly 10,000 different parties in the cities of New York and Brooklyn that handle the milk that is consumed in the two cities, some handling large quantities and others lesser amounts; in fact, some parties retailing less than one can per day.

While I am fully aware that the dairy department has to recognize demands upon the service from all parts of the State, and that the demands are much greater than can be supplied with the number of employes possible to be compensated from the present appropriation, I consider it my duty to call attention to the fact that it is impossible, with the limited number of employes allotted to this division of the department, to keep the adulteration of milk as fully under control as the interests of the consumers demand. I am also aware that the same conditions that apply to the second division, where the milk is consumed, will apply to the third and fourth divisions, where a large share of the milk shipped to the cities is produced.

There are a large number of stables situated in the suburbs of the cities of New York and Brooklyn in which there are over 3,000 cows kept, the milk from which is consumed in the two

cities named; therefore, it is necessary to keep a close watch on them to see that the stables are kept in proper condition and that no unwholesome food is fed to the cows. This has required a great deal of time to be devoted to this branch of the duties of this division.

As soon as it became evident that the cholera had reached the port of New York, I ordered, in addition to the usual inspections, a special inspection of all the stables situated in the suburbs of the above-named cities, as well as those located in the smaller cities and villages in this division of the department, and am pleased to be able to say that in most cases we found the stables in good order and the food of a wholesome character. In a few cases there was not sufficient ventilation, in others there was not enough attention paid to keeping the stables clean, but in every case where the attention of the owner of the cows was called to the defects in his management, he showed a willingness to improve on his former plans in order to conform to the requirements of the law, and later inspections have found such stables in a proper condition.

The condition of the stables and the food used show a marked improvement over the conditions existing when the first inspections under the dairy laws were made.

A careful watch has been kept during the year to see that no milk was shipped to market that was produced by diseased cows, but we have not discovered any violations of law from such source; in fact, we have not found any disease epidemic during the year in this division of the department, and I am well satisfied that the rigorous measures adopted by the State and national boards of health a few years ago have almost, if not entirely, eradicated pleura-pneumonia from this part of the State and reduced the existence of tuberculosis to the minimum.

The following are tables showing the daily average receipts of milk, condensed milk and cream, in the city of New York, as taken from the *Milk Reporter*, for the years 1891 and 1892.

Daily Average Receipts in New York, Per Week, of Cans of Forty Quarts each of Milk, Condensed Milk and Cream, as taken from the Milk Reporter for the Year 1891.

	WEEK ENDING OCT. 7.			WEEK ENDING OCT. 14.			WEEK ENDING OCT. 21.			WEEK ENDING OCT. 28.		
	Milk	Cream	Condensed	Milk	Cream	Condensed	Milk	Cream	Condensed	Milk	Cream	Condensed
RAILROADS.												
New York, Lake Erie and Western	28,785	999	179	27,319	732	173	26,719	683	192	26,477	699	176
New York City and Harlem.....	12,991	29	563	12,574	32	492	14,177	35	477	13,977	34	424
New York, Ontario and Western.....	18,917	1,102	.....	15,242	649	.....	16,421	584	.....	16,437	563	.....
New York, Susquehanna and Western.....	10,052	253	.....	9,623	180	.....	9,466	131	.....	9,258	122	.....
New York and Northern	6,680	.....	.....	6,756	.....	.....	6,890	.....	.....	6,747	.....	.....
New York, New Haven and Hartford.....	3,697	.....	.....	3,519	.....	.....	3,625	.....	.....	3,635	.....	.....
West Shore.....	6,655	155	532	6,139	76	461	6,324	121	415	5,963	104	464
Homer Ramsdell Transportation.....	5,303	223	.....	5,538	217	.....	5,423	236	.....	5,539	196	.....
Long Island	1,676	.....	.....	1,714	.....	.....	1,736	.....	.....	1,710	.....	.....
Delaware, Lackawanna and Western	28,548	233	.....	27,806	279	.....	28,820	285	.....	28,980	230	.....
New Jersey Central	1,872	43	.....	1,890	41	.....	1,876	41	.....	1,889	40	.....
Lehigh Valley	737	.....	.....	733	.....	.....	735	.....	.....	732	.....	.....
Other sources	4,179	.....	.....	4,180	.....	.....	4,178	.....	.....	4,175	.....	.....
Totals	130,042	3,036	1,274	124,125	2,203	1,116	126,239	2,116	1,084	125,539	2,087	1,064

Daily Average Receipts in New York, Per Week, of Cans of Forty Quarts each of Milk, Condensed Milk and Cream, as taken from the Milk Reporter for the Year 1891 — (Continued).

RAILROADS.	WEEK ENDING NOV. 4.			WEEK ENDING NOV. 11.			WEEK ENDING NOV. 18.			WEEK ENDING NOV. 25.		
	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.
New York, Lake Erie and Western.....	20,947	750	173	27,020	790	166	26,554	760	168	26,980	971	161
New York City and Harlem	14,308	35	484	14,526	33	404	14,436	39	526	14,890	30	685
New York, Ontario and Western.....	16,860	548	.....	16,547	514	.....	16,319	533	.....	16,332	633	...
New York, Susquehanna and Western.....	9,838	143	.....	9,474	143	.....	9,361	137	...	9,585	157	.....
New York and Northern	6,792	.....	.....	6,908	.....	...	6,632	...	...	6,603	.....	.....
West Shore.....	5,746	181	441	5,823	122	455	5,746	106	417	5,731	90	393
New York, New Haven and Hartford.....	3,538	.....	.....	3,542	.....	...	3,527	.....	...	3,557	.....	.....
Delaware, Lackawanna and Western.....	22,963	349	.....	23,082	220	.....	23,930	218	.....	23,360	225	.....
Long Island.....	5,766	.....	.....	5,965	...	.....	5,175	.....	.....	5,283	.....	.....
New Jersey Central	1,780	38	.....	1,777	35	.....	1,730	37	.....	1,754	36	.....
Homer Ramsdell Transportation Company	5,304	210	.....	5,534	225	.....	5,346	194	...	5,423	165	.....
Lehigh Valley	739	.....	...	710	.....	.....	703	.....	.....	705	.....	.....
Other sources ..	4,356	.....	...	4,200	.....	.....	4,319	.....	.....	4,330	.....	.....
Totals	123,119	2,110	1,097	124,490	2,060	1,115	123,323	2,032	1,105	123,439	2,325	1,134

Daily Average Receipts in New York, Per Week, of Cans of Forty Quarts each of Milk, Condensed Milk and Cream, as taken from the Milk Reporter for the Year 1891 — (Continued).

RAILROADS.	WEEK ENDING DEC. 2.			WEEK ENDING DEC. 9.			WEEK ENDING DEC. 16.			WEEK ENDING DEC. 23.		
	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.
New York, Lake Erie and Western	25,935	771	159	26,085	699	163	26,164	773	168	26,833	870	174
New York City and Harlem	14,902	40	534	15,923	40	568	15,731	40	570	16,182	42	529
New York, Ontario and Western.....	16,137	616	.....	16,040	516	.....	15,996	582	.....	15,415	596	.....
New York, Susquehanna and Western.....	9,390	127	.....	1,033	131	.....	9,391	125	.....	9,505	127	.....
New York and Northern	6,562	.....	.....	6,849	.....	.....	6,901	.....	.....	7,041	.....	.....
West Shore.....	5,790	175	434	5,956	582	445	6,202	523	475	6,462	503	490
New York, New Haven and Hartford.....	2,980	14	.....	2,965	14	.....	2,950	13	.....	2,923	16	.....
Delaware, Lackawanna and Western	19,853	94	.....	19,540	96	.....	19,349	93	.....	18,746	94	.....
Long Island	5,407	.....	.....	5,622	.....	.....	5,995	.....	.....	5,743	.....	.....
New Jersey Central	1,764	21	.....	1,823	24	.....	1,817	26	.....	1,782	32	.....
Homer Ramsdell Transportation Company.....	5,251	169	.....	5,426	175	.....	5,206	202	.....	5,423	203	.....
Lehigh Valley.....	483	2	.....	448	2	.....	430	2	.....	421	3	.....
Other sources	3,537	.....	.....	3,461	.....	.....	3,849	.....	.....	4,173	.....	.....
Totals	123,941	2,029	1,127	121,171	2,309	1,176	119,983	2,331	1,213	120,655	2,576	1,193

Daily Average Receipts in New York, Per Week, of Cans of Forty Quarts each of Milk, Condensed Milk and Cream, as taken from the Milk Reporter for the years 1891-92 — (Continued).

RAILROADS.	WEEK END'g DEC. 30, 1891.			WEEK ENDING JAN. 6, 1892.			WEEK END'g JAN. 13, 1892.			WEEK END'g JAN. 20, 1892.		
	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.
New York, Lake Erie and Western	25,870	780	173	30,811	745	180	31,339	753	198	31,410	753	204
New York City and Harlem	16,450	39	495	17,410	41	834	17,437	43	.....	17,449	42	307
New York, Ontario and Western	14,914	570	.....	15,396	581	.....	15,575	574	.....	15,590	569	.....
New York, Susquehanna and Western	9,419	123	.....	9,390	127	.....	9,429	126	.....	9,451	129	.....
New York and Northern	6,164	.....	.....	7,523	.....	.....	7,551	.....	.....	7,604	.....	.....
New York, New Haven and Hartford	2,816	13	.....	3,253	33	.....	3,249	35	.....	3,255	33	.....
West Shore	6,707	601	460	10,441	111	556	10,400	110	553	10,568	108	548
Homer Ramsdell Transportation Company	5,180	250	.....	4,394	80	.....	4,282	76	.....	4,274	79	.....
Long Island	5,768	.....	.....	5,271	.....	.....	5,304	.....	.....	5,296	.....	.....
Delaware, Lackawanna and Western	17,913	92	.....	18,658	.....	.....	18,699	.....	.....	18,737	.....	.....
New Jersey Central	1,794	43	.....	1,778	32	.....	1,763	35	.....	1,749	34	.....
Lehigh Valley	345	.....	.....	362	12	.....	380	14	.....	391	15	.....
Other sources	3,913	.....	.....	4,143	.....	.....	4,158	.....	.....	4,179	.....	.....
Totals	117,253	2,511	1,027	128,730	1,762	1,080	129,566	1,765	1,107	129,953	1,767	1,119

Daily Average Receipts in New York, Per Week, of Cans of Forty Quarts each of Milk, Condensed Milk and Cream, as taken from the Milk Reporter for the Year 1892 — (Continued).

RAILROADS.	WEEK ENDING JAN. 27.			WEEK ENDING FEB. 8.			WEEK ENDING FEB. 10.			WEEK ENDING FEB. 17.		
	Milk.	Cream.	Condensed	Milk.	Cream.	Condensed	Milk.	Cream.	Condensed	Milk.	Cream.	Condensed
New York, Lake Erie and Western	31,314	764	202	32,433	789	216	32,501	798	199	32,529	818	197
New York City and Harlem	17,465	44	378	17,732	39	375	18,053	37	379	18,188	38	373
New York, Ontario and Western.....	15,584	579	.....	16,072	729	.....	16,262	717	.....	16,349	723	.....
New York, Susquehanna and Western.....	9,444	131	.....	9,153	144	.....	8,991	147	.....	8,979	149	.....
New York and Northern	7,646	.....	.....	7,901	.....	.....	8,015	.....	.....	8,097	.....	.....
New York, New Haven and Hartford.....	8,273	84	.....	8,349	35	.....	8,255	33	.....	8,248	38	.....
West Shore.....	10,742	105	526	11,077	135	601	11,187	140	609	11,218	139	619
Homer Ramsdell Transportation Company.....	4,289	75	.....	2,428	40	.....	.....	.....	.....	.....	.....	.....
Long Island	5,287	.....	.....	5,335	.....	.....	5,469	.....	.....	5,453	.....	.....
Delaware, Lackawanna and Western	18,768	.....	.....	19,412	.....	.....	20,300	.....	.....	20,314	.....	.....
New Jersey Central	1,724	36	.....	1,714	56	.....	1,699	54	.....	1,689	58	.....
Lehigh Valley	397	13	.....	389	14	.....	384	16	.....	394	12	.....
Other sources	4,187	.....	.....	4,230	.....	.....	4,189	.....	.....	4,209	.....	.....
Totals	130,130	1,781	1,106	131,155	1,981	1,192	130,235	1,942	1,187	130,567	1,975	1,189

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Daily Average Receipts in New York, Per Week, of Cans of Forty Quarts each of Milk, Condensed Milk, and Cream, as taken from the Milk Reporter for the year 1892 — (Continued).

RAILROADS.	WEEK ENDING FEB. 24.			WEEK ENDING MARCH 2.			WEEK ENDING MARCH 9.			WEEK ENDING MARCH 16.		
	Milk.	Cream.	Condensed.	Milk	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.
New York, Lake Erie and Western	32,599	827	193	32,059	776	184	31,429	759	187	31,354	734	182
New York City and Harlem	18,123	35	374	17,690	40	423	16,978	47	453	16,660	54	467
New York, Ontario and Western	16,357	714	.....	16,589	721	.....	16,476	739	.....	16,349	756	.....
New York, Susquehanna and Western	8,785	145	.....	9,227	139	.....	9,419	136	.....	9,537	132	.....
New York and Northern	8,101	.....	.....	7,751	.....	.....	7,698	.....	.....	7,547	.....	.....
New York, New Haven and Hartford	3,250	34	.....	3,194	33	.....	3,147	34	.....	3,059	37	.....
West Shore	11,129	143	607	11,255	159	598	11,350	145	576	11,398	162	589
Homer Ramsdell Transportation Company .....	.....	.....	.....	2,026	.....	.....	4,699	.....	.....	4,737	.....	.....
Long Island	5,478	.....	.....	5,370	.....	.....	5,349	.....	.....	5,327	.....	.....
Delaware Lackawanna and Western	20,290	.....	.....	20,957	.....	.....	21,478	.....	.....	21,769	.....	.....
New Jersey Central	1,694	56	.....	1,750	54	.....	1,769	57	.....	1,778	62	.....
Lehigh Valley	389	14	.....	463	14	.....	658	18	.....	679	15	.....
Other sources	4,207	.....	.....	4,200	.....	.....	4,219	.....	.....	4,227	.....	.....
Totals	130,411	1,968	1,174	132,161	1,985	1,205	134,669	1,995	1,216	134,450	1,962	1,238

Daily Average Receipts in New York, Per Week, of Cans of Forty Quarts each of Milk, Condensed Milk and Cream, as taken from the Milk Reporter for the Year 1892.—(Continued).

RAILROADS.	WEEK ENDING MARCH 23.			WEEK ENDING MARCH 30.			WEEK ENDING APRIL 6.			WEEK ENDING APRIL 13.		
	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.
New York, Lake Erie and Western	81,304	721	179	81,104	718	181	81,172	1,049	161	81,967	1,067	168
New York City and Harlem	16,708	57	469	16,695	59	476	15,983	61	304	16,098	63	293
New York, Ontario and Western	16,127	759	.....	16,044	774	.....	17,556	1,068	.....	17,649	1,098	.....
New York, Susquehanna and Western	9,729	124	.....	9,732	119	.....	9,874	162	.....	9,859	176	.....
New York and Northern	7,469	.....	.....	7,467	.....	.....	7,140	.....	.....	6,984	.....	.....
New York, New Haven and Hartford	2,987	89	.....	2,924	85	.....	2,460	32	.....	2,419	29	.....
West Shore	11,479	169	567	11,498	164	571	11,306	188	724	11,284	179	742
Homer Ramsdell Transportation Company	4,697	.....	.....	4,991	.....	.....	5,321	.....	.....	5,272	.....	.....
Long Island	5,338	.....	.....	5,329	.....	.....	5,403	.....	.....	5,447	.....	.....
Delaware, Lackawanna and Western	21,749	.....	.....	21,876	.....	.....	23,800	270	.....	24,019	299	.....
New Jersey Central	1,784	59	.....	1,799	56	.....	1,798	57	.....	1,754	63	.....
Lehigh Valley	649	17	.....	658	15	.....	988	4	.....	1,099	3	.....
Other sources	4,249	.....	.....	4,211	.....	.....	4,200	.....	.....	4,187	.....	.....
Totals	134,419	1,945	1,215	134,358	1,940	1,228	136,511	2,886	1,188	137,518	2,972	1,203

Daily Average Receipts in New York, Per Week, of Cans of Forty Quarts each of Milk, Condensed Milk and Cream, as taken from the Milk Reporter for the Year 1892 — (Continued).

RAILROADS.	WEEK ENDING APRIL 20.			WEEK ENDING APRIL 27.			WEEK ENDING MAY 4.			WEEK ENDING MAY 11.		
	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.
New York, Lake Erie and Western	31,788	1,098	186	31,856	1,085	178	32,973	1,547	165	33,742	1,719	184
New York City and Harlem.....	15,476	67	284	15,981	64	278	15,594	70	384	15,942	75	219
New York, Ontario and Western.....	17,687	1,157	.....	17,703	1,120	.....	18,651	1,386	.....	18,759	1,473	.....
New York, Susquehanna and Western.....	9,342	164	.....	9,327	168	.....	9,620	196	.....	9,789	211	.....
New York and Northern	7,199	.....	.....	7,084	.....	.....	7,332	.....	.....	7,458	.....	.....
New York, New Haven and Hartford.....	2,389	26	.....	2,303	28	.....	2,414	81	.....	2,469	29	.....
West Shore.....	11,259	194	758	11,277	182	749	11,197	233	817	10,469	247	847
Homer Ramsdell Transportation Company	5,459	.....	.....	5,376	.....	.....	5,418	244	.....	5,504	397	.....
Long Island	5,895	.....	.....	5,418	.....	.....	5,506	.....	.....	5,549	.....	.....
Delaware, Lackawanna and Western.....	23,276	331	.....	24,150	315	.....	25,850	415	.....	26,748	469	.....
New Jersey Central	1,887	49	.....	1,806	56	.....	1,878	65	.....	1,887	68	.....
Lehigh Valley.....	987	5	.....	1,043	4	.....	1,287	11	.....	1,394	16	.....
Other sources	4,219	.....	.....	4,207	.....	.....	4,189	.....	.....	4,268	.....	.....
Totals	137,423	3,091	1,228	137,594	3,022	1,205	141,903	4,203	1,216	143,988	4,704	1,250

Daily Average Receipts in New York, Per Week, of Cans of Forty Quarts each of Milk, Condensed Milk and Cream, as taken from the Milk Reporter for the Year 1892 — (Continued).

RAILROADS.	WEEK ENDING MAY 18.			WEEK ENDING MAY 25.			WEEK ENDING JUNE 1.			WEEK ENDING JUNE 8.		
	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.
New York, Lake Erie and Western.....	34,199	1,708	168	34,016	1,813	175	35,513	2,135	176	36,918	2,466	168
New York City and Harlem.....	16,197	65	195	15,890	71	203	15,469	75	196	15,311	97	139
New York, Ontario and Western.....	19,966	1,565	.....	19,362	1,533	.....	20,767	1,762	.....	21,625	2,187	.....
New York, Susquehanna and Western.....	9,907	224	.....	9,842	217	.....	9,513	230	.....	10,319	249	.....
New York and Northern	7,529	.....	.....	7,516	.....	.....	7,709	.....	.....	8,119	.....	.....
New York, New Haven and Hartford.....	2,449	41	.....	2,450	35	.....	2,492	32	.....	2,667	38	.....
West Shore.....	11,645	239	889	11,067	252	868	11,102	263	818	11,117	307	903
Homer Ramsdell Transportation Company	5,481	458	.....	5,496	427	.....	5,779	469	.....	5,929	567	.....
Long Island	5,617	.....	.....	5,572	.....	.....	5,664	.....	.....	5,796	.....	.....
Delaware, Lackawanna and Western	27,517	511	.....	27,125	490	.....	29,111	521	.....	31,814	639	.....
New Jersey Central	1,987	81	.....	1,982	84	.....	1,784	78	.....	1,637	67	.....
Lehigh Valley.....	1,549	12	.....	1,470	14	.....	1,618	16	.....	1,686	19	.....
Other sources.....	4,239	.....	.....	4,200	.....	.....	4,198	.....	.....	4,229	.....	.....
Totals	148,382	4,964	1,252	145,880	4,937	1,246	150,719	5,581	1,190	157,169	6,636	1,210

NINTH ANNUAL REPORT OF THE

Daily Average Receipts in New York, Per Week, of Cans of Forty Quarts each of Milk, Condensed Milk and Cream, as taken from the Milk Reporter for the Year 1892 — (Continued).

	WEEK ENDING JUNE 15.			WEEK ENDING JUNE 22.			WEEK ENDING JUNE 29.			WEEK ENDING JULY 6.		
	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.
RAILROADS.												
New York, Lake Erie and Western	37,876	2,594	157	37,459	2,742	160	37,548	2,667	163	35,802	2,471	126
New York City and Harlem	14,817	103	174	15,200	116	168	15,043	105	154	13,635	89	166
New York, Ontario and Western	21,487	2,318	.....	22,540	2,499	.....	22,225	2,433	.....	23,171	2,304	.....
New York, Susquehanna and Western.....	11,317	344	.....	11,724	339	.....	10,916	306	.....	10,652	296	.....
New York and Northern	8,061	.....	.....	8,249	.....	.....	8,155	.....	.....	7,940	.....	.....
New York, New Haven and Hartford.....	2,803	39	.....	2,859	31	.....	2,744	35	.....	2,618	33	.....
West Shore	11,322	533	989	11,437	547	987	11,312	529	952	10,406	315	998
Homer Ramsdell Transportation Company	6,193	536	.....	6,302	607	.....	6,167	581	.....	6,005	431	.....
Long Island	5,514	.....	.....	5,934	.....	.....	5,859	.....	.....	4,323	.....	.....
Delaware, Lackawanna and Western	33,247	719	.....	33,769	737	.....	33,930	711	.....	32,150	629	.....
New Jersey Central	1,536	61	.....	1,579	69	.....	1,596	63	.....	1,416	55	.....
Lehigh Valley.....	1,793	20	.....	1,840	19	.....	1,806	21	.....	1,704	19	.....
Other sources	4,230	.....	.....	4,175	.....	.....	4,213	.....	.....	4,357	.....	.....
Totals	160,556	7,318	1,370	158,325	7,496	1,324	161,534	7,306	1,299	153,238	6,731	1,190

Daily Average Receipts in New York, Per Week, of Cans of Forty Quarts each of Milk, Condensed Milk and Cream, as taken from the Milk Reporter for the Year 1892.— (Continued).

	WEEK ENDING JULY 13.			WEEK ENDING JULY 20.			WEEK ENDING JULY 27.			WEEK ENDING AUG. 3.		
	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.
RAILROADS.												
New York, Lake Erie and Western.....	35,448	2,233	111	35,729	2,467	127	35,511	2,380	119	34,911	2,089	131
New York City and Harlem.....	11,424	68	157	12,097	81	179	12,229	77	168	11,913	71	152
New York, Ontario and Western.....	21,194	2,255	.....	22,348	2,439	.....	22,162	2,352	.....	22,147	2,157	.....
New York, Susquehanna and Western.....	11,497	327	.....	9,673	269	.....	10,508	234	.....	10,451	261	.....
New York and Northern	7,185	.....	.....	6,980	.....	.....	7,098	.....	.....	6,909	.....	.....
New York, New Haven and Hartford.....	2,554	37	.....	2,649	34	.....	2,597	38	.....	2,611	33	.....
West Shore.....	10,777	327	913	9,945	289	866	10,361	308	889	9,892	253	940
Homer Ramsdell Transportation Company	6,119	428	.....	5,977	387	.....	6,048	406	.....	6,239	352	.....
Long Island	2,746	.....	.....	2,919	.....	.....	2,517	.....	.....	2,243	.....	.....
Delaware, Lackawanna and Western	32,232	714	.....	31,568	728	.....	31,750	701	.....	32,231	590	.....
New Jersey Central.....	1,347	43	.....	1,439	52	.....	1,386	49	.....	1,353	43	.....
Lehigh Valley.....	1,637	24	.....	1,739	20	.....	1,687	22	.....	1,598	17	.....
Other sources	4,113	.....	.....	4,142	.....	.....	4,274	.....	.....	4,200	.....	.....
Totals	148,283	6,516	1,181	147,199	6,766	1,172	148,218	6,627	1,176	146,698	5,866	1,234

Daily Average Receipts in New York, Per Week, of Cans of Forty Quarts each of Milk, Condensed Milk and Cream, as taken from the Milk Reporter for the Year 1892 -- (Continued).

RAILROADS.	WEEK ENDING AUG. 10.			WEEK ENDING AUG. 17.			WEEK ENDING AUG. 24.			WEEK ENDING AUG. 31.		
	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.
New York, Lake Erie and Western	34,511	1,751	117	39,708	1,454	158	34,023	1,597	163	34,111	1,601	148
New York City and Harlem	11,569	63	147	11,216	69	129	11,824	57	125	11,515	63	136
New York, Ontario and Western	22,395	1,999	.....	32,069	1,745	.....	21,787	1,946	.....	22,092	1,998	.....
New York, Susquehanna and Western	10,247	217	.....	10,024	186	.....	10,498	248	.....	10,255	217	.....
New York and Northern	6,694	.....	.....	6,466	.....	.....	6,847	.....	.....	6,650	.....	.....
New York, New Haven and Hartford	2,539	37	.....	2,845	32	.....	2,527	38	.....	2,632	35	.....
West Shore	9,475	224	122	9,161	213	943	9,237	192	921	9,265	203	938
Homer Ramsdell Transportation Company	6,377	327	.....	6,456	233	.....	6,534	241	.....	6,473	239	.....
Long Island	1,832	.....	.....	1,529	.....	.....	1,196	.....	.....	1,211	.....	.....
New Jersey Central	31,216	461	.....	33,242	423	.....	32,987	481	.....	32,589	455	.....
Delaware, Lackawanna and Western	1,256	25	.....	1,197	50	.....	1,173	39	.....	1,211	42	.....
Lehigh Valley	1,681	21	.....	1,589	15	.....	1,673	13	.....	1,596	12	.....
Other sources	4,099	.....	.....	4,183	.....	.....	4,386	.....	.....	4,214	.....	.....
Totals	148,631	5,146	210	143,795	4,475	1,230	144,743	4,852	1,309	143,619	4,406	1,223

Daily Average Receipts in New York; Per Week, of Cans of Forty Quarts each of Milk, Condensed Milk and Cream, as taken from the Milk Reporter for the Year 1892 — (Concluded).

	WEEK ENDING SEPT. 7.			WEEK ENDING SEPT. 14.			WEEK ENDING SEPT. 21.			WEEK ENDING SEPT. 28.		
	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.	Milk.	Cream.	Condensed.
RAILROADS.												
New York, Lake Erie and Western	32,250	657	199	32,943	562	186	31,551	660	210	32,247	636	197
New York City and Harlem	11,240	114	389	12,442	98	947	11,539	82	234	12,143	93	361
New York, Ontario and Western	11,138	1,186	.....	10,639	1,167	.....	11,644	1,263	.....	11,127	1,183	.....
New York, Susquehanna and Western	10,918	120	.....	1,453	114	.....	10,217	123	.....	12,921	119	.....
New York and Northern	7,197	.....	.....	7,165	.....	.....	7,228	.....	.....	7,194	.....	.....
New York, New Haven and Hartford	3,031	25	.....	3,230	22	.....	3,254	19	.....	8,193	21	.....
West Shore	8,442	217	637	8,498	213	591	8,375	231	663	8,435	217	637
Homer Ramsdell Transportation Company	6,066	282	.....	6,217	269	.....	5,922	235	.....	6,069	288	.....
Leng Island	1,426	.....	.....	1,510	.....	.....	1,557	.....	.....	1,499	.....	.....
Delaware, Lackawanna and Western	31,730	225	.....	31,476	196	.....	32,092	263	.....	31,780	224	.....
New Jersey Central	1,034	23	.....	987	22	.....	1,075	19	.....	1,029	21	.....
Lehigh Valley	1,649	25	.....	1,625	18	.....	1,690	22	.....	1,654	20	.....
Other sources	4,519	.....	.....	4,610	.....	.....	4,419	.....	.....	4,511	.....	.....
Totals	130,742	2,874	1,225	131,953	2,691	1,124	130,553	2,937	1,316	131,802	2,832	1,215

Total Receipts over all Roads for the Year Ending September 30, 1892.

	Cans milk.	Cans cream.	Cans condensed milk.	Estimated value, freight included.	Average market price to producers.	Platform price.
					Cents.	Cents.
October	545,935	9,454	4,538	\$978,175 45	3.00	1.57
November	493,330	8,607	4,441	789,087 35	3.16	1.99
December	643,003	11,806	5,738	1,272,488 81	3.50	1.76
January	518,369	7,075	4,412	1,218,735 57	3.25	1.57
February	522,388	7,866	4,742	973,016 62	3.00	1.43
March	670,757	9,707	6,102	1,218,627 67	3.00	1.48
April	549,046	11,976	4,825	924,965 42	2.50	1.29
May	540,108	18,812	4,964	894,603 76	2.25	1.16
June	733,212	84,287	6,203	1,209,102 49	2.00	1.21
July	596,268	26,630	4,719	938,301 16	2.00	1.58
August	722,886	25,145	6,008	1,159,080 42	2.25	1.32
September	525,050	11,324	4,880	889,899 00	2.50	1.34
	7,040,342	182,689	61,690	\$12,416,668 72	*2.70	.....

* Average price for year.

Detailed Report of Work Performed (Vinegar).

The following is a detailed report of the work performed in this department, between September 30, 1891, and October 1, 1892, in prosecuting the law relating to the sale of vinegar:

A. D. Clark, expert, employed in the above service thirty days:

Number of days in court.....	6
Number of days obtaining evidence	3
Number of days on special duty	1
Number of days inspecting vinegar in stores	18
Number of days inspecting wholesale dealers and manu- facturers	2

Total number of days	30
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Number of samples purchased and taken	3
Number of samples delivered to chemists	3
Number of appearances in cases	6
Number of complaints made	1
Number of wholesale dealers and manufacturers inspected,	4
Number of stores inspected	585
Total number of vinegar inspections	860
Estimated number of miles traveled	805

W. W. Meeteer, expert, employed in the above service thirty-nine days:

Number of days in court	6
Number of days obtaining evidence	1
Number of days on special duty .....	.....
Number of days inspecting vinegar in stores	28
Number of days inspecting wholesale dealers and manu- facturers	4

Total number of days	39
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Number of samples purchased and taken	8
Number of samples delivered to chemists	8
Number of appearances in cases	11

Number of complaints made	3
Number of wholesale dealers and manufacturers inspected,	14
Number of stores inspected.....	885
Total number of vinegar inspections	1,534
Estimated number of miles traveled	1,363

E. S. Wilson, expert, employed in the above service fifty-eight days:

Number of days in court.....	
Number of days obtaining evidence.....	2
Number of days on special duty.....	
Number of days inspecting vinegar in stores.....	56
Total number of days.....	58

Number of samples purchased and taken.....	
Number of samples delivered to chemist.....	
Number of appearances in cases.....	
Number of complaints made.....	
Number of wholesale dealers and manufacturers inspected,	
Number of stores inspected.....	2,598
Total number of vinegar inspections.....	3,071
Estimated number of miles traveled.....	2,020

J. McGuire, expert, employed in the above service thirty days:

Number of days in court.....	
Number of days obtaining evidence.....	1
Number of days on special duty.....	
Number of days inspecting vinegar in stores.....	29
Total number of days.....	30

Number of samples purchased and taken	1
Number of samples delivered to chemists.....	1
Number of appearances in cases.....	
Number of complaints made...../	

Number of wholesale dealers and manufacturers inspected,	1
Number of stores inspected.....	1,727
Total number of vinegar inspections.....	2,123
Estimated number of miles traveled.....	1,142

J. T. Norton, expert, employed in the above service thirty-one days:

Number of days in court	10
Number of days obtaining evidence	1
Number of days on special duty	
Number of days inspecting vinegar in stores	16
Number of days inspecting wholesale dealers and manu- facturers	4
Total number of days	31

Number of samples purchased and taken	4
Number of samples delivered to chemists	
Number of appearances in cases	10
Number of complaints made	
Number of wholesale dealers and manufacturers inspected,	10
Number of stores inspected	503
Total number of vinegar inspections	787
Estimated number of miles traveled	941

Joseph J. Sorogan, expert, employed in the above service fifty-one days:

Number of days in court	14
Number of days obtaining evidence	10
Number of days on special duty	6
Number of days inspecting vinegar in stores	17
Number of days inspecting wholesale dealers and manu- facturers	4
Total number of days	51

Number of samples purchased and taken .....	....
Number of samples delivered to chemists .....	....
Number of appearances in cases	14
Number of complaints made .....	....
Number of wholesale dealers and manufacturers inspected,	4
Number of stores inspected	264
Total number of vinegar inspections	306
Estimated number of miles traveled	1,400

T. R. Gray, expert, employed in the above service seventeen days:

Number of days in court	2
Number of days obtaining evidence	1
Number of days on special duty	1
Number of days inspecting vinegar in stores	13
Total number of days	17

Number of samples purchased and taken .....	....
Number of samples delivered to chemists .....	....
Number of appearances in cases	2
Number of complaints made .....	....
Number of wholesale dealers and manufacturers inspected .....	....
Number of stores inspected	525
Total number of vinegar inspections	600
Estimated number of miles traveled	565

Charles Stillwell, A. M., and Thomas S. Gladding, A. M.:

Number of analyses of vinegar samples	6
Number of appearances in cases	11
Number of days in court	8

J. F. Geisler, Ph. C.:

Number of analyses of vinegar samples	2
Number of appearances in cases	10
Number of days in court	10

J. J. Marrin, counsel:

Number of cases prosecuted	3
Number of cases disposed of	3
Number of convictions	3
Number of appearances in cases	12
Number of days in court	7

Total (Vinegar).

Number of days, expert	256
Number of days in court, experts, chemists and counsel..	63
Number of days obtaining evidence	19
Number of days on special duty	8
Number of days inspecting vinegar	177
Number of days inspecting wholesale dealers and manu- facturers	14
Number of samples purchased and taken	16
Number of samples delivered to chemist	12
Number of appearances in cases	76
Number of complaints made	4
Number of wholesale dealers and manufacturers inspected,	33
Number of stores inspected	7,087
Number of vinegar inspections	9,281
Number of cases prosecuted	4
Number of cases disposed of	4
Number of cases convicted	4
Number of cases not disposed of .....	.....
Amount of fines imposed in above cases	\$200
Estimated number of miles traveled	8,236

The status of the five following prosecutions for violation of the law relating to adulterated vinegar was fully reported to you in my eighth annual report. The final disposition of them is given in the annexed schedule.

Case No.	NAMES.	Called for trial.	Court.	Place.	Result.	Remarks.
61	People v. Kropke.....	Oct. 19, 1891	Special Sessions	New York.....	Pleaded guilty	Fined fifty dollars.
52	People v. Hammond	Nov. 18, 1891	Special Sessions.....	Patchogue	Dismissed .....	.....
66	People v. Sparmer	Dec. 29, 1891	Special Sessions.....	Brooklyn.....	Pleaded guilty	Sentence suspended.
73	People v. Brush	Nov. —, 1891	Special Sessions.....	Huntington.....	Dismissed .....	.....
13	People v. Edeshelmer .....	.....	General Sessions	New York.....	.....	Nolle prosequi entered.

Prosecutions (Vinegar).

The following statement represents prosecutions under chapter 515, Laws of 1889, relating to the sale of adulterated vinegar and the present status of the cases:

CASE No. 78.

THE PEOPLE v. MOHEMANN.

Justice Connelly's Police Court, Brooklyn, N. Y.

Warrant issued April 27, 1892; answered to April twenty-ninth, and pleaded guilty; fined fifty dollars.

Witnesses: W. W. Meeteer, J. T. Norton, chemist, C. M. Stillwell.

CASE No. 79.

THE PEOPLE v. MEINHOLD.

Tombs Police Court, New York City.

Warrant issued May 17, 1892; answered to May nineteenth; held to bail for trial at Special Sessions. Called for trial May twenty-fifth; adjourned to June first, to sixth, to eighth, and to June thirteenth. Tried, convicted; fined fifty dollars.

Counsel, Joseph J. Marrin.

Witnesses: W. W. Meeteer, J. T. Norton, chemist, C. M. Stillwell.

CASE No. 83.

THE PEOPLE v. POIT.

Tombs Police Court, New York City.

Warrant issued May 17, 1892; answered to May nineteenth; held to bail for trial at Special Sessions. Called for trial May twenty-fifth; adjourned to June first and tried. Convicted; fined fifty dollars.

Counsel, Joseph J. Marrin.

Witnesses: W. W. Meeteer, J. T. Norton, chemist, C. M. Stillwell.

CASE No. 76.

THE PEOPLE v. HUNER.

Tombs Police Court, New York City.

Warrant issued May 18, 1892; answered to May nineteenth; held to bail for trial at Special Sessions. Called for trial May twenty-fifth; adjourned to June first, tried. Convicted; fined fifty dollars. Counsel, Joseph J. Marrin.

Witnesses: Arch. D. Clark, John McGuire, chemist, J. F. Geisler.

The result of the four preceding prosecutions for violation of the vinegar law, commenced between September 30, 1891, and October 1, 1892, were as follows:

Convicted at Special Sessions	4
Awaiting trial at Special Sessions	
Awaiting trial at General Sessions	
Total	<u>4</u>
Total fines imposed in above cases	<u>\$200</u>
Total of Prosecutions (Oleomargarine, Adulterated Milk and Vinegar).	

The final result of prosecutions under the laws relating to oleomargarine, adulterated milk and vinegar, for the year ending September 30, 1892, were as follows:

Oleomargarine cases remaining untried September 30, 1891,	1
Milk cases remaining untried September 30, 1891	5
Vinegar cases remaining untried September 30, 1891	<u>5</u>
Total cases remaining untried September 30, 1891....	11
Oleomargarine cases prosecuted during the year ending September 30, 1892	57
Milk cases prosecuted during the year ending September 30, 1892	24
Vinegar cases prosecuted during the year ending September 30, 1892	<u>4</u>
Total number of cases	<u>96</u>

Convicted	70
Deceased	1
Absconded	1
Dismissed from calendar	14
Bail forfeited	1
Remaining on calendar awaiting trial	9
	<hr/>
Total	96
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Total of Fines Imposed During the Year.

Total fines imposed during the year (vinegar)	\$250
Total fines imposed during the year (oleomargarine) ..	2,250
Total fines imposed during the year (milk)	550
	<hr/>
Total	\$3,050
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Great care has been given to the enforcement of the vinegar law during the year, and a few parties have been prosecuted. The profits to be gained by selling adulterated vinegar are so small that but few persons are willing to risk prosecution for selling it in violation of law.

During the period from May first to November first, there was very little danger of oleomargarine being sold; for this reason, the attention of the dairy experts has been mainly directed, during that period, to looking after adulterated milk and, incidentally, after adulterated vinegar. During the other six months of the year, their attention has been mainly directed to looking after the sale of oleomargarine in violation of the law, and at the same time, incidentally, after adulterated milk and vinegar.

By dividing the duties of the experts in this manner, the violations of the dairy laws have been kept under control fairly well, but when it is considered that there is nearly or quite 3,000,000 population in this division of the Dairy Department, and that there have been but five dairy experts employed during the past year; that there are over 15,000 stores and peddlers that handle dairy products, more or less of whom, if not carefully watched, are liable to violate some one of the dairy laws; and that

it is necessary for two experts to go together in order to fulfill the requirement of the law when violations are discovered and prosecutions made, then it will be readily seen that the inspections of milk and vinegar, and the detective work necessary to be done in order to keep the sale of oleomargarine down to a minimum, cannot be done with this small force. I am compelled to admit that the sale of oleomargarine has increased during the year past, and that a further increase in the sale of these goods will follow during the coming year unless the force in this division is nearly or quite doubled.

In conclusion, I am greatly pleased to state that I have been supported to the full extent of their ability by each of the State experts, chemists and counsel employed in this division of the dairy department; also by the experts detailed to assist in this division by Assistant Commissioner Tuthill; and wish to add that the district attorneys and their able assistants have forwarded our prosecutions to a favorable termination; and the judges of the different courts, in which prosecutions have been brought, have given the work of this department prompt and careful attention.

Respectfully yours,

B. F. VAN VALKENBURGH,

Assistant State Dairy Commissioner.

Report of F. D. Tuthill.

Hon. JOSIAH K. BROWN, *New York State Dairy Commissioner,*
Albany, N. Y.

Sir.—I submit this my annual report for the year ending September 30, 1892.

Each successive year shows a gradual increase in the supply of milk in this division and a decided falling off in the adulteration thereof. This fact, of itself, should be most convincing that the efforts of the Dairy Commission to place a better article of food before the consumer have borne good fruits.

The milk shipped direct to the market is, I am confident, almost entirely pure; but where it is delivered at manufactories or shipping creameries, and thrown promiscuously together, there is an occasional risk taken; but, as a whole, it is very gratifying to note the difference in the number of prosecutions during the present year with those of the past. Few complaints of adulteration have been received at this office, and, upon investigation, the larger part of those proved to be without cause.

Milk peddlers throughout the various towns and cities are, as a rule, supplying their customers with a good article. There seems to be a desire on the part of most peddlers to conform to all the requirements of the law, and, when the experts are making a tour of inspection, they show no disposition to avoid them, but rather receive them kindly and offer any assistance desired.

The condensing of milk is rapidly gaining favor, and new industries being established, thus enabling the producer to realize better prices for his milk than if shipped to market, since the ruling price at condenseries is in excess of that made by the "Milk Exchange, Limited."

The following schedule shows the market prices for milk from 1878 to 1892.

MONTH.	1878.	1879.	1880.	1881.	1882.
January	3½	2½	3	3½	4
February	3¼	2½	3	3	4
March	3	2½	3	3	3
April	2½	2	2½	2¾	3
May	2	2	2	2	2½
June	2	2	2	2	2½
July	2	2	2½	2	2½
August	2	2	2½	2	3
September	2½	2	3	3	3½
October	2½	2½	3	4	3½
November	3	3	4	4	3½
December	3	3	4	4	4
	31¼	28	34½	35¼	39

MONTH.	1883.	1884.	1885.	1886.	1887.
January	3½	4	3¼	3.50	3.25
February	3½	3½	3	3	3
March	3¼	3	3	3	3
April	3	3	2¾	2.75	2.50
May	2½	2¼	2¼	2.15	2.32
June	2.375	2¼	2	2	2
July	3	2½	2¼	2	2.40
August	3	2½	2.70	2.25	2.50
September	3½	3	2½	2.50	2.50
October	3½	3	2½	3.50	3.25
November	4	3¾	3¼	3.50	3.50
December	4	3½	3.84	3.50	3.50
	31¼	26	33.29	33.65	33.72

MONTH.	1888.	1889.	1890.	1891.	1892.
January	3.50	3.25	3.25	3	3
February	3.15	3	3.17	3	3
March	3	3	3	2.75	3
April	3	2.57	2.62	2.50	2.50
May	2.41	2	2	2.32	2.25
June	2	2	2	2	2
July	2.25	2	2	2	2
August	2.38	2	2.39	2.26	2
September	2.50	2.33	2.50	2.50	2.50
October	3	2.50	2.50	3	3
November	3.25	3	2.33	3.16	3½
December	3.50	3.38	3.25	3.50	.....
	33.94	31.03	....	....	.....

The sale and use of oleomargarine during the past year has been of rare occurrence; it seems to be confined to the larger cities; two or three suspicious parties have been followed by the experts, but in each case the investigation proved that the surmises were groundless.

Cattle in this division have been free from epidemics and contagious diseases.

DETAILED REPORT OF WORK PERFORMED.

The following table gives a detailed report of the work performed by each employe in this division of the department, between September 30, 1891, and October 1, 1892, in enforcing the laws relating to the sale of adulterated milk and butter:

Report of Work Performed by Geo. W. Price.

Number of days in court	7
Number of days inspecting milk	178
Number of days inspecting herds	1
Number of days obtaining evidence	15
Number of days on special duty	81
Total number of days	282

Number of creameries inspected as to condition	22
Number of stores, restaurants, etc., inspected	498
Number of packages of butter inspected	2,930
Number of milk peddlers inspected	48
Number of stores inspected	9
Number of stables inspected	2
Number of cows inspected	29
Number of creamerymen's milk inspected on delivery at boats and railroad depots	44
Number of dairymen's milk inspected on delivery at cream- eries and railroad depots	1,010

Number cans of creamerymen's milk inspected on delivery at boats and railroad depots	2,419
Number cans dairymen's milk inspected on delivery at creameries and railroad depots	3,101
Number of cans of peddlers' milk inspected	179
Number of cans of store milk inspected	10

Total number of cans of milk inspected 5,709

Total number of samples delivered to chemist	13
Total number complaints made	4
Estimated number of miles traveled	12,950

Report of Work Performed by W. W. Meeteer.

Number of days in court	8
Number of days inspecting butter and milk	14
Number of days obtaining evidence	1
Total number of days	23
Number of stores and restaurants inspected	30
Number of creamerymen's milk inspected on delivery at boat and railroad depots	2
Number of dairymen's milk inspected on delivery at cream- eries and railroad depots	161

Number of cans of creamerymen's milk inspected on delivery at boat and railroad depots	139
Number of cans of dairymen's milk inspected on delivery at creameries and railroad depots.....	335
	<hr/>
Total number of cans inspected.....	474
	<hr/>
Total number of samples delivered to chemist.....	1
Estimated number of miles traveled.....	2,290
	<hr/>

Report of Work Performed by R. H. Palmer.

Number of days in court.....	2
Number of days inspecting milk and butter.....	215
Number of days inspecting herds.....	2
Number of days obtaining evidence.....	8
Number of days on special duty.....	51
	<hr/>

Total number of days.....	278
	<hr/>

Number of creameries inspected as to condition.....	4
Number of stores, restaurants, etc., inspected.....	464
Number packages of butter inspected.....	2,810
Number of milk peddlers inspected.....	37
Number of stores inspected.....	12
Number of stables inspected.....	2
Number of cows inspected.....	76
Number creamerymen's milk inspected on delivery at boat and railroad depots	161
Number of dairymen's milk inspected on delivery at cream- eries and railroad depots.....	159
	<hr/>

Number of cans of creamerymen's milk inspected on deliv- ery at boats and railroad depots.....	8,137
Number of cans of dairymen's milk inspected on delivery at creameries and railroad depots.....	1,159

Number of cans of peddlers' milk inspected.....	152
Number of cans of store milk inspected.....	12

Total number of cans inspected..... 9,460

Estimated number of miles traveled..... 14,600

Report of Work Performed by T. C. Dubois.

Number of days in court.....	3
Number of days inspecting milk.....	39
Number of days on special duty.....	10
Number of days obtaining evidence.....	16

Total number of days..... 68

Number of creameries inspected as to condition.....	11
Number of milk peddlers.....	32
Number of creamerymen's milk inspected on delivery at boat and railroad depots.....	14
Number of dairymen's milk inspected on delivery at cream- eries and railroad depots.....	312

Number of cans of creamerymen's milk inspected on delivery at boat and railroad depots.....	867
Number cans of dairymen's milk inspected on delivery at creameries and railroad depots	1,228
Number of cans of peddlers' milk inspected	85
Number of cans of store milk inspected	2

Total number cans inspected

2,182

Total number complaints made	3
Estimated number miles traveled	3,710

PROSECUTIONS.

The subjoined statement represents the prosecutions during the year ending September 30, 1892, for violations of chapter 183 of Laws of 1885, and amendments thereof, relating to the sale of adulterated milk and butter:

CASE No. 2580.

THE PEOPLE v. SAMUEL F. SMITH, *Farmer*.

Court of Special Sessions, Justice Crawford.

Warrant issued March 5, 1891; answered to August 10, 1891. Pleaded guilty; fined twenty-five dollars; twenty dollars remitted by the court.

Witnesses: W. W. Meeteer, A. D. Clark, chemist, Thomas S. Gladding.

Remarks: This case was omitted from last year's report.

CASE No. 2606.

THE PEOPLE v. E. D. PIERSON, *Creameryman*.

Court of Special Sessions, Recorder McCroskery, Newburgh.

Warrant issued October 6, 1891; answered to November 19, 1891. Pleaded guilty; fined twenty-five dollars.

Witnesses: W. W. Meeteer, T. C. Dubois, chemist, Thomas S. Gladding.

CASE No. 2604.

THE PEOPLE v. FERDINARD HORTON, *Dairyman*.

Court of Special Sessions, Justice J. H. Romer, White Plains.

Warrant issued September 25, 1891; answered to September 29, 1891; adjourned to October 13, 1891; adjourned to October 20, 1891; adjourned to October 29, 1891.

Counsel, Frederick W. Clark.

Witnesses: W. W. Meeteer, A. D. Clark.

Remarks: Waived examination and gave bail for appearance before the grand jury, November 10, 1891; no indictment found.

CASE No. 2806.

THE PEOPLE v. JOHN LEVY.

Court of Special Sessions, Justice C. H. Minor, Carmel.

Warrant issued September 28, 1891; answered to October 21, 1891; adjourned to December 9, 1891. Pleaded guilty; fined twenty-five dollars.

Witnesses: W. W. Meeteer, A. D. Clark, chemist, E. G. Love.

CASE No. 2967.

THE PEOPLE v. WM. LOWE, *Creameryman.**Supreme Court, Orange County.*

Witnesses: Geo. W. Price, W. W. Meeteer, chemist, Thos. S. Gladding.

Remarks: Witnesses appeared before grand jury November 9, 1891, and gave evidence; no indictment.

CASE No. 2944.

THE PEOPLE v. JOHN LEIF, *Farmer.**Court of Special Sessions, Justice Walter Denniston, Rocklet.*

Warrant issued November 14, 1891; answered to November 14, 1891. Pleaded guilty; fined twenty-five dollars.

Witnesses: George W. Price, Mat. Walwanis, chemist, Jos. F. Geisler.

CASE No. 2953.

THE PEOPLE v. JACOB KRAUSE, *Street Peddler.**Court of Special Sessions, Justice Coons, Saugerties.*

Warrant issued December 16, 1891; answered to December 16, 1891. Pleaded guilty; fined twenty-five dollars.

Witnesses: T. C. DuBois, George W. Price, chemist, R. D. Clark.

CASE No. 2952.

THE PEOPLE v. ORLANDO BROOKS, *Street Peddler.*

Court of Special Sessions, Justice Golders, Athens.

Warrant issued December 22, 1891; answered to December 22, 1891. Pleaded guilty; fined twenty-five dollars.

Witnesses: T. C. DuBois, Geo. W. Price, chemist, R. D. Clark.

CASE No. 2948.

THE PEOPLE v. G. EDWIN MILLER, *Farmer.*

Court of Special Sessions, Justice A. V. N. Powelson, Middletown.

Warrant issued January 11, 1892; answered to January 11, 1892. Pleaded guilty; fined fifty dollars.

Witnesses: George W. Price, R. H. Palmer, chemist, Jos. F. Geisler.

Remarks: Second offense.

CASE No. 2523.

THE PEOPLE v. ANDREW ERICKSON.

Court of Special Sessions, Justice C. H. Minor, Carmel.

Warrant issued March 26, 1892; answered to July 19, 1892. Pleaded guilty; fined twenty-five dollars.

Witnesses: A. D. Clark, W. W. Meeteer, chemist, E. G. Love.

CASE No. 2947.

THE PEOPLE v. IRA VANKLEECK, *Farmer.*

Court of Special Sessions, Justice George S. Greene, Bullville.

Warrant issued March 28, 1892; answered to March 28, 1892. Pleaded guilty and sentence suspended.

Witnesses: George W. Price, R. H. Palmer, chemist, Joseph F. Geisler.

CASE No. 2963.

THE PEOPLE v. JOHN J. THORNE, *Creameryman.*

Supreme Court, Delaware County.

Summons served September 20, 1892; answered to September 24, 1892. Pled guilty; fined \$100 and costs.

Counsel, Greene & Bedell, Goshen.

Witnesses: George W. Price, R. H. Palmer, chemist, R. D. Clark.

CASE No. 2605.

THE PEOPLE v. WM. H. NELSON, *Dairyman.*

Court of Special Sessions, Justice J. H. Romer, White Plains.

Warrant issued September 25, 1891; answered to September 25, 1891; adjourned to October 13, 1891; adjourned to October 20, 1891; adjourned to October 29, 1891.

Counsel, Frederick W. Clark.

Witnesses: W. W. Meeteer, A. D. Clark, chemist, Charles M. Stillwell.

Remarks: Waived examination and gave bail for appearance before the grand jury, November 10, 1891. Indictment found.

F. D. TUTHILL,

Assistant State Dairy Commissioner.

Report of J. H. Brown.

To the Hon. JOSIAH K. BROWN, *New York State Dairy Commissioner* :

I herewith very respectfully submit this, my second annual report, of the work performed in the fourth division of the New York State Dairy Commission, comprising the counties of Oswego, Oneida, Herkimer, Montgomery, Fulton, Hamilton, Warren and Essex, during the past year.

During the winter of 1891 and 1892, nearly all my time was devoted to the inspection of vinegar, and seeing that no oleomargarine was sold in this section. Early in the winter I was informed that a shipment of oleomargarine was made to Watertown, N. Y. I immediately visited that city and met Mr. Charles S. Kellogg, the expert located there, who informed me that he knew of its presence and was watching it very closely; that he had been to see the parties and was satisfied that now we had found it out no attempt would be made to dispose of any of the goods there. We, however, kept a very close watch over them and none of the goods were sold in this State. Being informed that the oleomargarine agents were canvassing the boarding-houses, restaurants and hotels, trying to sell their goods, and feeling certain that if the proprietors were aware of just what kind of an article they were buying that very little, if any, would be sold, I obtained from the Albany office a large number of your circulars "to keepers of restaurants, boarding-houses and hotels." I mailed several hundred of these circulars to dealers in dairy products, to hotel keepers, restaurants and boarding-house proprietors in this division. This action I think had the desired effect. I also instructed all the agents and experts to be on their guard, and to inspect all places where these goods were liable to be sold or used. We kept this surveillance up all through the winter months and found but one sample which aroused our sus-

picion, and I am satisfied that none of the imitation dairy products were sold or used in this section.

As you are aware, this is a dairy section and the work must be done during the spring, summer and fall months, and for this reason, as I stated in my last report, several of our experts were retired from active service during the winter; this left a large territory to be covered by a few men.

On March 17, 1892, Mr. L. E. Scrafford, an agent of this department, made a special examination of the vinegar sold in Utica, N. Y., beginning at the same place where he and I began last season and following the same route. When we were through there last fall we found several places selling vinegar in violation of our law, and this trip was made to ascertain whether an inspection without suits would stop the sale of these goods. We found the adulterated goods on sale in only two places. We took samples from both of them and have begun suits in the Supreme Court. We have also had much the same experience in Rome, N. Y., which would clearly demonstrate the fact that an inspection, without taking samples, will in nearly all cases stop the sale of spurious goods. I now have three vinegar suits in the Supreme Court, and am informed by the attorneys that they will be tried the next term of court, in January. We have taken many other samples of adulterated vinegar, but I have not thought it wise to begin any more suits until the above cases are decided. I found at Utica, N. Y., in April last, one of the wholesale houses had several barrels of Detroit vinegar. I called their attention to our law, and informed them what course we proposed to follow; they promised not to sell in this State. I thought it would do no harm, however, to keep watch of them for a short time, believing that they would undertake to dispose of their stock here; we did not have to wait long before Mr. Scrafford informed me that they had shipped a barrel to Jefferson county. I went to Watertown and in company with Mr. Kellogg visited the dealer who made the purchase and found the barrel there, but not opened; we tested it in the presence of the proprietor, and showed him how, by selling the same, he was laying himself liable under the statutes; he informed us that he purchased supposing it was cider vinegar, and that if it was not he should immediately

ship it back. In visiting the wholesale house a short time afterward, I saw the same barrel, which had been returned, and one of the proprietors informed me that by sending the goods so far in the country they were in hopes that it would not be noticed by us, so that they could dispose of the stock on hand, but that we, as a department, was watching so closely that they would not attempt it again, and they have not. I call your attention to this matter simply to emphasize the necessity of continual watchfulness on our part, and also to show that even some of our large houses will not always do as they say they will, especially if their profits are affected. I was also informed that the manufacturers of these goods were guaranteeing not only the wholesaler but his customers against any fine or costs that they might incur by the enforcement of our law. We have watched all stores and taken a great many samples, going over the same territory often, and as a result, nearly all the stores in this division are now selling only cider vinegar. We have watched all the freight-houses of the several railroads and the canal warehouses and find that a very small amount is shipped from or through them, and whenever we find barrels ready to be shipped we take the name and call on the parties in a few days, and, without an exception, we have induced them to ship the goods back to the wholesale dealer.

This division has been unusually free from the adulterations of the milk product for the past season, with the exception of Oswego county, where twenty samples below the standard have been taken. Our experts and agents have been extremely busy, answering calls for inspections and help; one fact, however, has been very noticeable: that in nearly all the requests we have received for inspections, those making the request have stated that they did not think any of their patrons were at the present time adulterating their product, but that they wanted the inspector to come to their factory and inspect the milk, as they believed that the benefits derived from our laws, now, was not so much on account of any prosecutions or arrests we might make, but in the fact that there was such a department having cheese matters in charge, and that our agents were liable to appear at any time to inspect the product delivered.

We find that milk in this section is receiving much better attention at the farm than it formerly did (this improvement is unquestionably due to the great effort in this direction made by us) and, consequently, the product from our factories is better and commands a larger price. I have attended nearly every meeting of the Utica Board of Trade during the past season, and have there met not only the salesmen and buyers, but many of the makers, and no complaint of any kind against this department or any of its employes has been made. On the contrary, all agree that it is one of the greatest benefits bestowed upon the honest producer and the consumer by our Legislature.

I received a letter from Newport, N. Y., stating that at a certain factory, not far from that village, they were having trouble with the cheese, caused, as they believed, by the milk of certain animals which were supposed to be diseased. I at once went there, and fully investigated the matter. Some of the suspected stock was owned by officers of the factory, so that the maker was a little delicate about asserting himself in a decided manner. The milk was inspected, and some found not to be right. We visited the dairies where this milk was produced, and forbid the delivery of any more of the milk; and the maker has since informed me that they did not deliver, and that his trouble immediately stopped. We are continually having calls of this kind and under our law can do nothing but forbid the delivery or sale of the milk, and, if not obeyed, take a sample to the chemist for analysis. It seems to me that we should be given more power in this line.

On July first, Mr. Charles D. Moore, of Lowville, N. Y., was appointed by you an assistant commissioner, and my division was reorganized; Lewis, Jefferson and St. Lawrence being taken from it and Montgomery, Fulton, Hamilton, Warren and Essex added.

For this reason I have omitted to mention the work done in those counties formerly under my supervision. I have turned over to Mr. Moore all my correspondence, facts, figures, etc., for those counties, and he will undoubtedly furnish a report to you for all the work performed there for the last year. The counties added are not large dairy counties, so I have devoted very little time to them yet, being very busy in Oswego, Oneida and Herkimer

counties, where the dairy industry was at its height. I have left the remaining five counties for the coming winter months, believing that the best interests of all could be attained by this course. I now have arrangements made to give these new counties assigned to me a thorough and systematic inspection, and will make such necessary changes in the plan of work for the coming season as to give them their full share of attention.

This spring I requested all the experts and agents to give me a factory report of every factory visited, where they could get the maker to furnish the necessary information. I wished these reports, so as to be able to state definitely what the factorymen and makers thought of the present way of purchasing milk (by weight). The questions asked were:

First. Is there a difference in the value of the pure milk received from different patrons of your factory for the purpose of being manufactured into butter or cheese?

This was answered "Yes" by 135; "no" by four, and forty-two failed to answer.

Second. Do you know of any plan or method of crediting patrons for their milk, based upon its quality, which would be nearer just than the plan now generally followed of crediting by weight?

This was answered "Yes" by sixty-nine; "no" by fifty-nine, and fifty-four did not answer.

Third. If so, please state the plan.

Sixty answered "By a fat test;" four, by weight, and 117 did not answer.

A large percentage of the factorymen failed to respond, but it will be seen from the answers given, which are not from one locality, but scattered over my entire district, that there is dissatisfaction with the present way of purchasing, and it would seem to me that we were now offering a premium for poor milk.

There are three of the cheese instructors in my division, but as they each make a personal annual report to you I will leave the details for them to state. They have been continually employed during all the season, mainly giving instruction at cheese factories and creameries, and in holding dairy meetings

in districts not generally visited by them. There is one fact which has been very noticeable, that wherever they have been not only the factorymen but the dairymen want them to return, and it has been almost impossible to get away from some of the localities. They have also spent much time at the New York State Experiment Station, at the urgent request of the director, being there 108 days this season. A full report of their work will be given by them.

Doubtful Samples.

Below find a statement of the doubtful samples taken this season, viz.:

Tony Gerard, Utica; T. N. Kinney, Utica; W. H. Shaut, Little Falls; Andrew Chase, ; Richard Castle, Whitesboro; E. E. Marvel Utica; Damon Brown & Son, Cedarville; Fred Chapman, Bowen's Corners; Mrs. Eliza Bond, Scriba; William Butts, Scriba; Fred Dean, Mexico; Alanson Butler, Lamsons; J. H. Markham, Butterfly; John Carey, Pennelville; Lewis Rawson, Pennelville; John Van Wie, Lysander; Henry Burr, South Hannibal; Alfred Fuller, Bowen's Corners; Frank Looker, Richard; Edwin Myre, Palermo; Frank Calkins, Texas; Spencer Richardson, Dugway; Antoine Winks, Caughdenoy; Henry Trimbey, Washington Mills; E. J. Wadsworth, Washington Mills; R. L. Lewis, Prospect; John Howland, Gloversville; T. H. House, Fort Plain; John Howland, Gloversville; John Wittenbeck, St. Johnsville; John Crocker, St. Johnsville; Sol. Warrig, Caughdenoy; B. C. Purrington, Parish; Samuel Matterson, Sand Banks; John Crocker, St. Johnsville.

PROSECUTIONS.

The following cases have been tried and disposed of as follows, viz.:

LABEL No. 2931.

THE PEOPLE v. JOHN CAMPBELL.

Warrant issued November 14, 1891. The defendant appeared before Recorder C. N. Bulger, of Oswego, pleaded guilty and was fined twenty-five dollars.

William B. Howard, witness; Wm. Manlius Smith, chemist.

LABEL No. 2929.

THE PEOPLE v. JAMES FORTH.

Warrant issued by Recorder C. N. Bulger, of Oswego. Defendant appeared, pleaded guilty, was fined twenty-five dollars and all the costs before made.

LABEL No. 2930.

THE PEOPLE v. MICHAEL KENNEDY.

Warrant issued by Recorder Bulger, November 18, 1891. Defendant appeared December 28, 1891, pleaded guilty and was fined twenty-five dollars.

William B. Howard, witness; Wm. Manlius Smith, chemist.

LABEL No. 3141.

THE PEOPLE v. HERBERT KELLER.

Warrant issued by Recorder Bulger, November 19, 1891. Defendant appeared November twenty-seventh, pleaded guilty and was fined twenty-five dollars.

William B. Howard, witness; Wm. Manlius Smith, chemist.

LABEL No. 2928.

THE PEOPLE v. H. A. CLARK.

Warrant issued November nineteenth, by Recorder Bulger. Defendant appeared March 2, 1892, pleaded guilty and was fined twenty-five dollars.

William B. Howard, witness; Wm. Manlius Smith, chemist.

LABEL No. 3140.

THE PEOPLE v. LOUIS L. BARTIER.

Warrant issued by Recorder Bulger, November 19, 1891. Defendant appeared November 27, 1891, pleaded guilty and was fined twenty-five dollars.

Witnesses: William B. Howard, Wm. Manlius Smith, chemist.

LABEL No. 3338.

THE PEOPLE v. ANDREW CHASE.

Warrant issued by

Witness, H. A. Rees, Dr. Theo. Deecke, chemist.

LABEL No. 2221.

THE PEOPLE v. E. E. MARVEL.

Warrant issued December 18, 1891. Defendant appeared and pleaded guilty December 18, 1892, and was fined twenty-five dollars.

Witness, W. G. Spence, Dr. Theo. Deecke, chemist.

LABEL No. 2222.

THE PEOPLE v. DAMON BROWN & SON.

Warrant issued by Justice H. G. Knight, January 19, 1892. Defendants appeared, pleaded guilty and were fined twenty-five dollars.

LABEL No. 2223.

THE PEOPLE v. HENRY TRIMREY.

Warrant issued by Justice F. D. Blackstone, of New Hartford, September 5, 1892. Defendant appeared, pleaded guilty and was fined twenty-five dollars.

Witness, W. G. Spence, Dr. Theo. Deecke, chemist.

LABEL No. 2223.

THE PEOPLE v. Z. J. WADSWORTH.

Warrant issued by A. G. Pelton, of Washington Mills, September 14, 1892. Defendant appeared, pleaded guilty and was fined twenty-five dollars.

Witness, W. G. Spence, Dr. Theo. Deecke, chemist.

LABEL No. 2234.

THE PEOPLE v. R. L. LEWIS.

Warrant issued August 30, 1892, by Justice Ellis Griffiths, of Trenton. Defendant appeared, pleaded guilty and was fined twenty-five dollars.

Witness, W. G. Spence, Dr. Theo. Deecke, chemist.

The above is simply a general statement of the work. I have endeavored to speak only of those matters which seem to be of the greatest importance. The details are on file in your office. If I were to give in detail all our work it would be largely a repetition, making my report unnecessarily long.

In closing, I wish to say that all the experts, agents, chemists and attorneys in this division have faithfully and courteously performed all their duties; that no complaints have been received by me and that I have no criticisms or suggestions to make regarding the work.

Respectfully yours,

J. H. BROWN,

Assistant State Dairy Commissioner.

Report of Chas. D. Moore.

LOWVILLE, N. Y., *October 1, 1892.*

Hon. J. K. BROWN, *New York State Dairy Commissioner, Albany, N. Y.:*

Dear Sir.—In conformity with my duty I hereby submit my report of the work done by the dairy department in the sixth division, comprising the counties of Lewis, Jefferson, St. Lawrence, Franklin and Clinton, from July 1, 1892, to September 30, 1892, inclusive, three months, that being the time such division has been under my supervision.

During this time the instructors and inspectors have been constantly at work in various parts of the division, imparting much needed information, not only to cheese and butter makers but to the farmers generally throughout the division, or so much thereof as they have been able to get over when not engaged elsewhere about the State, not only as to the best methods of butter and cheese-making but as to the care of milk and feeding of stock that the best results might be obtained.

This work has been very effective in my judgment and much good has resulted from their labors.

This division, as you are doubtless aware, is one of the largest, if not the largest, butter and cheese producing district in the State, containing hundreds of cheese factories scattered over an immense tract of land, larger than some whole States, with only a limited number of instructors who have been compelled to work early and late at great inconvenience to themselves, many times being obliged to ride several miles during the early morning hours in order to reach factories before the farmers arrived with their milk. They are continually receiving calls that, for want of time, they are unable to answer.

As you are aware, the work most needed in this division is instruction in the more improved methods of cheese and butter making, and with the small force employed it is utterly impossible to visit all the factories during the cheese-making season.

Since July most of our work has been done in Lewis, Jefferson and St. Lawrence counties, with but little in the counties of Franklin and Clinton. But in the early spring, if possible, work will be pushed in those counties.

The instructors and inspectors inform me that there is a marked improvement this season, over any previous one, in the make of cheese and butter, and also in the quality of milk delivered at the factories, showing that the people are alert and anxious to avail themselves of any information obtainable that will tend to help them in securing better results for their labors. I have personally visited quite a portion of the division and talked with a good many makers, and wherever I have been I was impressed with the interest taken among the farmers to learn all that it is possible for them to learn that will tend in any way to better their condition; they are building better barns, paying more attention to the care and feeding of stock, taking better care of their milk, and, in fact, the average farmer seems to be waking up and looking about him to see if there is any thing he can do to bring about a better condition of affairs.

It has been my good fortune to be present when Messrs. George A. Smith, M. T. Morgan, W. W. Hall, H. A. Rees and E. A. Ayers, expert cheese-makers, have been giving instruction and making experiments in different factories in this division. Too much credit cannot be given them for the information they are imparting and results they are producing throughout this State; the value of their services to the farmers cannot be told. The services of these men are worth more to the farmers of this division than the cost of the entire Dairy Department, to say nothing of the great benefit to the consumer, which is the main object. Cheese-makers have told me that they were greatly benefited by the instruction given by these gentlemen, and one maker, who had been having considerable difficulty with his cheese, wrote me that

if I would send Mr. Rees back to his factory and let him remain there three or four days he would gladly pay all expenses.

We have had but little trouble with adulterated milk and but few samples have been taken. One in particular was taken by Inspector Charles Kellogg from the can of one Egbert Langdon, near Antwerp, N. Y., and was analyzed by Dr. Theodore Deecke, of Utica, N. Y., on the twenty-ninth day of September, which showed so much water that this case will be prosecuted.

Hoping that this report will meet with your approval, I remain,

Yours most respectfully,

CHARLES D. MOORE,

Assistant State Dairy Commissioner.

Report of Peter H. Parker.

HON JOSIAH K. BROWN, *New York State Dairy Commissioner,*
Albany, N. Y.:

Sir.—I have the honor to submit my second annual report as assistant dairy commissioner for the sixth division, comprising the counties of Broome, Chenango, Cortland, Madison, Onondaga, Tioga and Tompkins.

The Sixth Division.

The sixth division is one of the first in importance among the great dairy sections of this State. Not only are its dairymen engaged in the manufacture of large quantities of butter and cheese, but over 1,000,000 cans of forty quarts each, are yearly shipped to swell the milk supply of the city of New York; nor must we forget that the flourishing inland cities of Syracuse and Binghamton draw almost their entire supply from this division, and also that scores of villages that dot its valleys receive their supply from the same source; and in the last six months the city of Philadelphia has been receiving, over the Lehigh Valley railroad, a portion of its milk from this division, and, altogether, it is safe to estimate that we yearly ship, directly to the consumer, nearly 2,000,000 cans of milk.

The whole number of milk cows in this division at the present time is estimated at 250,000. At the estimated value, by the Secretary of Agriculture in 1890, of twenty-eight dollars per head, the total value of these cows would be \$7,000,000. If the value of their products be estimated at forty dollars (and I think that in the past year it will average this), it will bring the farmers of this division the princely sum of \$10,000,000.

The great milk-shipping railroads—the Delaware and Lackawanna, the Ontario and Western, the Delaware and Hudson, and

the Erie—pass through this division, and nearly 4,000 cans of milk are shipped daily along the lines of these roads to New York; nearly one-fourth of the milk supply of that city is furnished by the seven counties of this division.

The above statistics, which have been compiled with great care, will show the importance of this division as a great center of the milk-shipping business; and such has been the development of this industry in the last six or eight years, that I may venture to assert at no distant day (owing in a great measure to its railroad facilities) almost the entire milk production of this division will be required by the great cities within its reach.

The Work.

The labor of controlling the quality of the great amount of milk produced in this division for manufacturing and shipping purposes has been performed to the best of my ability with the small force of experts at my command. There are a few factories we have been unable to reach, and a large number which have been visited but once during the year; but, while we have not been able to stop all adulterations or catch all the rogues, we find, as the result of our work, a better quality of milk, which is steadily increasing, and that the influence of the Dairy Commission is being felt in every portion of this division; and I wish to state at this time, that I believe that this improvement is due to the police supervision of the Commission. I have reached this unavoidable conclusion, from a close observation of the results of the work of the small but earnest force of men under my direction; the utmost watchfulness and vigilance is required at all times and places to prevent adulterations, not only by the producer but by the shipper, for such is the cupidity and dishonesty of unprincipled producers and dealers, that the only safety to the consumers of dairy products in this State is in the faithful discharge of the duties of the employes of the Dairy Commission.

I am aware that it has been claimed that, with all the appropriations made for the work of the Dairy Commission, "it has brought no substantial benefit or increased prices to farmers." I think the claimant must have forgotten that the law which

created the Dairy Commission, says: "It is for the purpose of preventing deception in the sale of dairy products, and to preserve the public health." This is the work laid out for the Commission and it can do nothing else. However, it is an established fact that this "police supervision" has stopped seven-eighths of the adulterations of the dairy products in the State, and, by its power alone, holds in check a certain class that seeks to palm off upon the people its adulterated products. Is anyone prepared to say that the price of pure dairy products is no better than the price of adulterated products? If not, we must admit that the Dairy Commission has been of some benefit.

The truth is, experiment stations and the Dairy Commission follow different lines of work, in the main. The experiment station "is for the purpose of educating and informing the farmers of the details and economies of their industry." It is the teacher—by its experiments it becomes a great and necessary educator in the different branches of farming. But, while it may teach the farmer how to produce better milk, better butter and better cheese, it cannot compel him to make honest products; nor can it guard the people of the State against adulterated dairy products. This is the distinctive work of the Dairy Commission—to stand between the producer and the consumer—and the Dairy Commission with its police supervision obeys and enforces the law. Remove this police supervision from any section of the State and adulterations will increase. Blot out the wise statutes that created the Dairy Commission and in less than one year the State would be filled with oleomargarine and deluged with adulterated milk. Could an experiment station, with all its force and all its power, stem such a tide? No! But the Dairy Commission, with its intelligent police supervision, could and would.

The experiment station and the Dairy Commission were organized to accomplish great and good results. Closely associated in their work they should labor together until they can give the dairymen of our State the highest prices, the best products, and to the people the best and purest food.

The Standard.

After working two years, I am more and more convinced of the necessity of raising the standard of milk in my division, from August first to at least January first of every year. I believe the present standard is too low.

Oleomargarine.

We have found several lots of oleomargarine in this division but none has been sold in violation of the law, with the exception of one case, which occurred in Binghamton. The offender settled by paying \$100.

Tuberculosis.

One case of this disease occurred in my own town, which was referred to the health officer, and, after a careful examination, the animal was killed. A post-mortem examination developed the fact that it was tuberculosis, and of the most dangerous kind. Several other cases have occurred in my division, which have been referred to the different boards of health.

Vinegar.

In regard to our vinegar work, under chapter 515 of the Laws of 1889, we found a large number of parties selling vinegar that was below the standard, and in many instances these parties were ignorant of the quality of the vinegar they were selling. After prosecuting several flagrant cases, it seemed to have the desired effect, and to-day we think there is but very little adulterated vinegar upon the market in our division.

Of all the great and good results that have followed the work of the Dairy Commission, both to the producer and the consumer, the credit alone belongs to our worthy and efficient Dairy Commissioner, Josiah K. Brown, who has spared neither pains nor thought in working up this commission to the high standard which now exists.

DETAILED STATEMENT OF WORK PERFORMED.

Report of John D. Cady.

Number of days in court	10
Number of days inspecting milk	270
Number of days inspecting herds	2
Number of days obtaining evidence	15
Number of days on special duty	10
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Total number of days	307
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Number of creameries inspected as to condition	96
Number of butter creameries inspected as to condition....	61
Number of cheese factories inspected as to condition....	35
Number of milk peddlers inspected	195
Number of stores inspected	278
Number of cows inspected	128
Number of creamerymen's milk inspected on delivery at boat and railroad depots	281
Number of dairymen's milk inspected on delivery at cream- eries and railroad depots	245
Number of dairymen's milk inspected on delivery at butter creameries	520
Number of dairymen's milk inspected on delivery to cheese factories	384
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Number of cans creamerymen's milk inspected on delivery at boat and railroad depots	5,480
Number of cans dairymen's milk inspected on delivery at creameries and railroad depots	6,400
Number of cans dairymen's milk inspected on delivery at butter creameries	4,800

Number of cans dairymen's milk inspected on delivery at cheese factories	4,000
Number cans peddlers' milk inspected.....	694
Number cans store milk inspected.....	182
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Total number cans of milk inspected.....	21,636
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Total number of samples delivered to chemist.....	18
Total number of complaints made.....	12
Total number of appearances in cases.....	12
Estimated number of miles traveled.....	15,000
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Report of O. C. Griffis.

Number of days in court.....	6
Number of days inspecting milk.....	123
Number of days inspecting herds.....	.....
Number of days obtaining evidence.....	8
Number of days on special duty.....	40
	<hr/>
Total number of days.....	177
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Number of creameries inspected as to condition.....	77
Number of condenseries inspected as to condition.....
Number of butter creameries inspected as to condition....	1
Number of cheese factories inspected as to condition.....	4
Number of milk peddlers inspected.....	105
Number of creamerymen's milk inspected on delivery at boat and railroad depots.....	72
Number dairymen's milk inspected on delivery at cream- eries and railroad depots.....	98
Number dairymen's milk inspected on delivery at butter creameries	19
Number dairymen's milk inspected on delivery at cheese factories	5
	<hr/>
Number cans creamerymen's milk inspected on delivery at boat and railroad depots	2,651
Number cans dairymen's milk inspected on delivery at creameries and railroad depots.....	145

Number cans dairymen's milk inspected on delivery at butter creameries	67
Number cans dairymen's milk inspected on delivery at cheese factories	71
Number cans peddlers' milk inspected.....	369
Number cans store milk inspected.....	1
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Total number cans of milk inspected.....	3,304
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Total number of samples delivered to chemist.....	3
Total number of complaints made.....	2
Total number of appearances in cases.....	2
Estimated number of miles traveled.....	7,095
Doubtful cans of milk.....	50
Number days inspecting vinegar.....	10
Number days inspecting butter.....	11
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Report of Charles Sears.

Number of days in court (5, 6, 7, 8, 9, 5).....	40
Number of days inspecting milk	44
Number of days inspecting herds
Number of days obtaining evidence	22
Number of days on special duty	12
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Total number of days	118
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Number creameries inspected as to condition.....	29
Number cheese factories inspected as to condition	4
Number milk peddlers inspected	127
Number dairymen's milk inspected on delivery at creameries and railroad depots	24
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Number cans creamerymen's milk inspected on delivery at boat and railroad depots	3,013
Number cans dairymen's milk inspected on delivery at creameries and railroad depots	180

Number cans dairymen's milk inspected on delivery at cheese factories	260
Number cans peddlers' milk inspected	284
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Total number cans milk inspected	3,495
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Total number of samples delivered to chemist	2
Total number complaints made	5
Total number of appearances in cases	43
Estimated number of miles traveled	11,030
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Report of J. J. Sorogan.

Number days in court	2
Number days inspecting milk	98
Number days inspecting herds	4
Number days obtaining evidence	1
Number days on special duty	6
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Total number of days	111
	<hr/>
Number creameries inspected as to condition	84
Number butter creameries inspected as to condition	4
Number cheese factories inspected as to condition	84
Number milk peddlers inspected	68
Number stores inspected	41
Number cows inspected	85
Number creamerymen's milk inspected on delivery at boat and railroad depots	17
Number dairymen's milk inspected on delivery at cream- eries and railroad depots	1,104
Number dairymen's milk inspected on delivery at butter creameries	137
Number dairymen's milk inspected on delivery at cheese factories	1,104
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Number cans creamerymen's milk inspected on delivery at boat and railroad depots	345
Number cans dairymen's milk inspected on delivery at but- ter creameries	218
Number cans dairymen's milk inspected on delivery at cheese factories	1,640
Number cans peddlers' milk inspected	180
Number cans store milk inspected	63

Total number of cans of milk inspected	4,154
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Total number of samples delivered to chemist	2
Total number of complaints made	1
Total number of appearances in cases	2
Estimated number of miles traveled	5,450
Doubtful cans of milk	6

Report of Charles F. Nash.

Number of days inspecting milk	10
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Number creameries inspected as to condition	1
Number butter creameries inspected as to condition	2
Number cheese factories inspected as to condition	5
Number dairymen's milk inspected on delivery at butter creameries	64
Number dairymen's milk inspected on delivery at cheese factories	181

Number cans dairymen's milk inspected on delivery at but- ter creameries	128
Number cans dairymen's milk inspected on delivery at cheese factories	364

Total number of cans milk inspected	492
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Estimated number of miles traveled	300
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Report of P. C. Harp.

Number of days inspecting milk	11
Number of days on special duty	3
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Total number of days	14
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Number cheese factories inspected as to condition.....	8
Number milk peddlers inspected	57
Number stores inspected	3
Number dairymen's milk inspected on delivery at butter creameries	42
Number dairymen's milk inspected on delivery at cheese factories	159
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Number cans dairymen's milk inspected on delivery at butter creameries	99
Number cans dairymen's milk inspected on delivery at cheese factories, (102, 125, 141, 40, 80).....	488
Number cans peddlers' milk inspected, (124, 131, 72).....	327
	<hr/>
Total number of cans of milk inspected.....	914
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PROSECUTIONS.

Milk.

BOTTLE No. 2679.

THE PEOPLE v. H. H. SEYMOUR.

Court Special Sessions, H. Cordyon Brown, Justice.

Warrant was issued December 31, 1892; was answered to February 13, 1892. Pleaded guilty and was fined twenty-five dollars.

Witness: O. C. Griffis, Wm. M. Smith, chemist.

BOTTLE No. 3231.

THE PEOPLE v. FRED BAUER.

Court Special Sessions, Geo. W. Chapman, Justice.

Warrant was issued September 13, 1892, and was returnable the same day. Pleaded guilty and was fined twenty-five dollars.

Witness: J. J. Sorogan, Wm. M. Smith, chemist.

BOTTLE No. 3219.

THE PEOPLE v. EVAN E. JONES.

Court Special Sessions, Geo. W. Chapman, Justice.

Warrant was issued October 27, 1892, and returnable October 29, 1892. Pleaded guilty and paid a fine of thirty-seven dollars.

Witness: J. J. Sorogan, Wm. M. Smith, chemist.

BOTTLE No. 2677.

THE PEOPLE v. N. H. HELLER.

Police Court, Clarence L. Smith, Police Justice.

Warrant was issued June 23, 1892, returnable the same day. Pleaded guilty and was fined twenty-five dollars.

Witnesses: O. C. Griffis, J. E. Cady, Harry Snyder, chemist.

BOTTLE No. 3218.

THE PEOPLE v. FRANK VOLLENER.

Court Special Sessions, Charles Moulton, Justice.

Warrant was issued September 20, 1892, and returnable the same day. Pleaded guilty and was fined twenty-five dollars.

Witness: J. E. Cady, Wm. M. Smith, chemist.

BOTTLE No. 3267.**THE PEOPLE v. S. D. LAMONT.***Court Special Sessions, A. G. Hill, Justice.*

Warrant was issued August 17, 1892. Pleaded guilty and paid a fine of twenty-five dollars.

Witnesses: J. E. Cady, P. H. Parker, E. M. Chamot, chemist.

BOTTLE No. 3239.**THE PEOPLE v. ACCOR & HOVER.***Court Special Sessions, P. P. Moses, Justice.*

Warrant was issued September 21, 1892, and returnable the same day. Pleaded guilty and paid a fine of twenty-five dollars.

Witnesses: Cady and Parker, E. M. Chamot, chemist.

BOTTLE No. 3240.**THE PEOPLE v. W. F. MONEILL.***Court Special Sessions, P. P. Moses, Justice.*

Warrant was issued September 21, 1892, and was returnable the same day. Pleaded guilty and was fined twenty-five dollars.

Witnesses: Cady and Parker, E. M. Chamot, chemist.

BOTTLE No. 3241.**THE PEOPLE v. EUNICE LEONARD.***Court Special Sessions, Judge Dewey, Justice.*

Warrant was issued September 20, 1892, and was returnable the same day. Pleaded guilty and was fined twenty-five dollars.

Witnesses: Cady and Parker, E. M. Chamot, chemist.

BOTTLE No. 3264.

THE PEOPLE v. CHAS. BAILEY.

Court Special Sessions, Aaron Delano, Justice.

Warrant was issued October 17, 1892, and returnable the same day. Pleaded guilty and was fined twenty-five dollars.

Witnesses: Parker and Cady, E. M. Chamot, chemist.

BOTTLE No. 3233.

THE PEOPLE v. NATHAN LEWIS.

Court Special Sessions, Aaron Delano, Justice.

Warrant was issued October 17, 1892, and returnable the same day. Pleaded guilty and paid a fine of twenty-five dollars.

Witnesses: Cady and Parker, E. M. Chamot, chemist.

BOTTLE No. 2673.

THE PEOPLE v. PETER TREEMOER.

Court Special Sessions, Judge Dewey, Justice.

Warrant was issued October 24, 1892, and returnable the same day, and adjourned until thirty-first. Pleaded guilty and was fined twenty-five dollars.

Witnesses: J. E. Cady and E. M. Chamot, chemist.

BOTTLE No. 3238.

THE PEOPLE v. VALENTINE LIDDINGTON.

Court Special Sessions, Judge Dewey, Justice.

Warrant was issued October 24, 1892, and returnable the same day. Pleaded guilty and sentence was suspended.

Witness: J. E. Cady, E. M. Chamot, chemist.

BOTTLE No. 3237.

THE PEOPLE v. SMITH CORNELIOUS.

Court Special Sessions, Judge Dewey, Justice.

Warrant was issued October 24, 1892, and returnable the same day. Pleaded guilty and was fined twenty-five dollars.

Witnesses: J. E. Cady, E. M. Chamot, chemist.

BOTTLE No. 3236.

THE PEOPLE v. ELWILL & HOLLENBECK.

Court Special Sessions, P. P. Moses, Justice.

Warrant was issued November 2, 1892, and was returnable the same day. Pleaded guilty and was fined twenty-five dollars.

Witnesses: J. E. Cady, G. W. Cavanaugh, chemist.

BOTTLE No. 2681.

THE PEOPLE v. E. LAMB AND W. W. WHITE.

Court Special Sessions, H. C. Brown, Justice.

Warrant was issued June 30, 1891, and returnable the same day. Pleaded guilty and was fined twenty-five dollars.

Witnesses: Griffis and Cady, Harry Snyder, chemist.

BOTTLE No. 2682.

THE PEOPLE v. E. D. PIERSON.

Court Special Sessions, D. N. Bartle, Justice.

Warrant was issued May 29, 1892, and returnable the same day, and it was adjourned to June 28, 1892. Pleaded guilty and paid a fine of twenty-five dollars.

Witnesses: Griffis and Parker, F. E. Englehardt, chemist.

Vinegar.

BOTTLE No. 2665.

THE PEOPLE *v.* J. PRINSTIEN.

Warrant was issued September 23, 1891, and returnable the same day; adjourned to September thirtieth. This case is awaiting the verdict in the Crouse case.

BOTTLE No. 2687.

THE PEOPLE *v.* GEO. N. CROUSE & Co.

Police Court, Mulloholand, Justice.

Warrant was issued September 23, 1891, and was returnable the same day; adjourned to October 7, 1891, to November 3, 1891, to November 11, 1891, and to November 24, 1891; adjourned again to December, 22, 1891, January 12, 1892, January 26, 1892, February 9, 1892, February 16, 1892, February 19, 1892, March 9, 1892. Discontinued for the present.

Witnesses: Parker and Sears, Wm. M. Smith, chemist.
Daniel Bookstaver, counsel.

BOTTLE No. 415.

THE PEOPLE *v.* J. H. DAY.

Police Court. A Jury Trial.

Warrant was issued July 24, 1891, and was returnable July 28, 1891; adjourned to August 6, 1891, August 10, 1891, August 22, 1891, October 8, 1891, October 29, 1891, December 3, 1891, January 26, 1892, February 16, 1892.

Witnesses: Sears and Parker, Wm. M. Smith, chemist.
James Dougherty counsel.
Prisoner was acquitted.

BOTTLE No. 1911.

THE PEOPLE v. F. T. GREENLEY.

Police Court, J. P. Merrill, Justice.

Warrant was issued March 17, 1891, and returnable the same day; adjourned to the twenty-fourth. Prisoner pleaded guilty and was discharged.

Witnesses: Griffis and Cady, Harry Snyder, chemist.

BOTTLE No. 2676.

THE PEOPLE v. J. C. STOWELL & SON.

Police Court, J. P. Merrell, Justice.

Warrant was issued March 17, 1891, and returnable the same day; adjourned to the twenty-fourth, when he pleaded guilty and was fined fifty dollars.

Witnesses: Cady and Griffis, Harry Snyder, chemist.

Oleomargarine.

SAMPLE No. 1.

THE PEOPLE v. J. DUNNING.

Police Court, F. M. Downs, Justice.

Warrant issued April 26, 1892; returnable the same day. Pleaded guilty and paid a fine of \$100.

Witnesses: Griffis and Parker, Wm. M. Smith, chemist.

Yours very truly,

PETER H. PARKER,

Assistant State Dairy Commissioner.

Report of Patrick H. Sutley.

CÁSTILE, N. Y., *December 1, 1892.*

HON. JOSIAH K. BROWN *New York State Dairy Commissioner,
Albany, N. Y.:*

Dear Sir.—I most respectfully submit this my annual report of the transactions of the seventh division of the Dairy Department ending September 30, 1892, comprising the following counties. Chemung, Genesee, Livingston, Schuyler, Steuben and Wyoming, some of which are large dairy counties, with about 100 cheese factories and several creameries, besides the large amount of dairy products shipped from some of these counties to the cities of Buffalo, Rochester, Elmira and Hornells-ville. The quality of milk manufactured into butter and cheese, and also the supply shipped to cities, has shown a decided improvement over previous years. Notwithstanding the fact that I have had but two inspectors in my division during the past year the various creameries and cheese factories have been visited, from time to time, throughout the entire division as often as our limited force would permit. Inspections of milk have been made by these two inspectors and but very little adulterating has been done by the patrons of the various factories, compared with former years. I am not prepared to say in my report whether these patrons who have been found guilty of adulterating their milk have had a change of heart, or whether the vigilant enforcement of the law in localities where adulterating has been heretofore carried on to an alarming extent acts as a reminder that detection and punishment is sure to follow in cases of willful violation of the statute. The limited number of prosecutions for the past year is evidence of the fact that the suppliers of milk to creameries and cheese factories have delivered

a better quality of milk than heretofore. The farmers have been, and are being, educated to the fact that too much care cannot be taken with the milk before delivering the same to the factory. It has been the aim of this department to impress upon the dairymen the importance of:

First. That the cows should be handled quietly and carefully.

Second. That the cows should have an abundance of good food and pure water.

Third. That they should be salted regularly, at least once a week, twice is better, or to place lump salt where they can have access to it.

Fourth. Milk regularly and do not let the milk stand where it can absorb odors from the stable or barn-yard.

Fifth. Keep the milk receptacle or can scrupulously clean. Use hot water always and, if greasy, use washing soda. Many of the dairymen pay too little regard to the proper care of the milk before taking the same to the factory, and it is difficult to make some of them understand that the milk contracts and absorbs odors, thus rendering it unfit to be manufactured into butter or cheese.

On August ninth a patron of the Cloverfield Combination No. 11, Bennington Center, Wyoming county, who had a dairy of twenty cows, came to us asking us to go to the factory and see why the maker refused to receive his milk. After making a fair test of the sample brought with him, with the lactometer and cream-gauge, and finding it all right, we proceeded to the factory to investigate and learn the cause of the trouble. In consulting the cheesemaker we found that the milk from this dairy caused what he termed "floaters," making it impossible for him to manufacture first-class cheese, which he was required to do by the Cloverfield Combination. He claimed that (after setting samples of this milk which produced on top of the glass a brown sediment) the patron's cows were diseased. We then proceeded to the farm of this patron and found his cows apparently in a good healthy condition. We went to the pasture and found that the cows were receiving the best of spring water. His barn-yards were dry and clean. But going behind his cow-barns we found a large pile

of barn-yard manure which had laid there a year or more, producing, in our opinion, a sediment of decayed matter which the milk was receiving. This manure was located on the west side of the milk-stand. We had him move his milk-stand to a proper place, and then asked the cheesemaker to receive the milk, which thereafter proved to be all right to the great satisfaction of the patrons as well as the cheesemaker.

July sixteenth we were called to Folsomdale to examine some cattle that were stricken down with an unknown disease, having been taken at night with a slight lameness in the hind leg or hip, and in the morning two were found dead. After an examination, and all the information we could get, we came to the conclusion that it was a disease known as blackleg. The cattle were young and, from what we can learn, we find that the disease only attacks young cattle. We would like to inquire whether or not there is any way known to the Dairy Department to discover this disease in its first stages, and a remedy therefor, knowing that it would be a great benefit to the dairymen of this division; it is so quick in its destruction that the farmers do not know that they have got any disease among their cattle, as they will appear well at night and be found dead in their pastures in the morning.

September sixteenth, at the solicitation of the board of health of Bath, Steuben county, we made an inspection of milk retailed there; owing to the appearance of cholera in this country, they were of the opinion from reports circulated, that they were using milk from diseased cows and which, perhaps, was adulterated and asked that we give it a thorough examination. Upon a thorough examination by our experts and the chemist we found the milk in a good, healthy and unadulterated condition.

PROSECUTIONS.

THE PEOPLE *v.* JOHN PORTER.

Supreme Court, Steuben County.

December 5, 1891, summons and complaint in the above entitled action to recover penalty of \$100 for violation of the State Dairy Law, personally served on the defendant.

December 23, 1891, defendant settled the said action. Paid to O. P. Stockwell, attorney for the department, the sum of \$100 and the costs of the action. One-half was paid by said attorney to the State Treasurer and the other one-half to the county treasurer of Steuben county. Witnesses: C. J. Morganstern, Bernhardt Murray, and W. H. Sage, chemist.

THE PEOPLE v. JOSEPH LIPPOLD.

Court of Special Sessions, before C. H. Bean, Justice of the Peace.

Warrant issued November 23, 1891. Defendant arraigned and pleaded not guilty; adjourned to November 24, 1891, at which time defendant pleaded guilty; fined twenty-five dollars.

THE PEOPLE v. ADELBERT GRUMMOND.

Court of Special Sessions, Allegany County, before Justice W. D. Ormiston.

Warrant issued and served October 24, 1890. Defendant pleaded not guilty and gave bail to appear before grand jury of Allegany county. January 6, 1891, witnesses on part of the department duly sworn before the grand jury and that body failed to indict.

THE PEOPLE v. WILLIAM GRUMMOND.

Court of Special Sessions, Allegany County, before W. D. Ormiston, J. P., Cuba, N. Y.

October 24, 1890, warrant issued and served. Defendant arraigned, pleaded not guilty and gave bail to appear before the grand jury of Allegany county.

January 6, 1891, witness on part of the People duly sworn and gave evidence before the grand jury, and that body failed to indict.

THE PEOPLE v. WILLIAM GRUMMOND.

Supreme Court, Allegany County.

November 20, 1890, summons and complaint to recover the penalty of \$100 for violating the New York State Dairy Law personally served on the defendant. Defendant answered. Said action is now pending and undisposed of.

THE PEOPLE v. EDWARD HODNETT.

Supreme Court, Allegany County.

November 18, 1890, summons and complaint served personally on defendant. November twenty-eighth, defendant answered said complaint. Said action is now pending in the General Term of this court.

THE PEOPLE v. HENRY W. TAFFT & ADDIS E. PERRY.

November 22, 1890, summons and complaint personally served on defendant Perry (defendant Tafft not being found by the sheriff within the State, summons not served on him).

December seventeenth, defendant Perry answered. June, 1891, action withdrawn. While it appeared upon the factory books that the milk was delivered or supplied by Tafft and Perry, in fact and truth Perry merely held a lien upon the milk by chattel mortgage and was not in fact a joint owner of the same, which fact was unknown at the time of the commencement of the action and the action was therefore withdrawn.

THE PEOPLE v. RANDALL A. PEASE.

Supreme Court, Steuben County.

April 11, 1891, summons and complaint personally served. April twentieth, defendant answered. This case is now pending and undisposed of, the trial thereof having been postponed owing to the illness of Chemist Sage.

In conclusion, permit me to bear testimony to the faithful and intelligent discharge of their duties by Experts Charles J. Morganstern and Grove Barnum; the analytical chemists, and Attorney O. P. Stockwell, whose ability and experience have greatly added in advancing the interests of this department and assisted in accomplishing the object for which it was established.

For the many courtesies extended by yourself, please accept my grateful acknowledgments.

Respectfully submitted,

PATRICK J. SUTLEY,
Assistant State Dairy Commissioner.

Report of John H. Foley.

HON. JOSIAH K. BROWN, *New York State Dairy Commissioner,*
Albany, N. Y.:

Dear Sir.—I respectfully submit this my annual report as assistant commissioner giving in a general way a brief account of the work done in my division of the Dairy Department of the State during the year ending September 30, 1892.

The counties of Monroe, Ontario, Seneca, Wayne and Yates, comprising the subdivision of the State placed under my general supervision, have received from the officers of the State Dairy Department, during the year, as much official attention as I could give them with the small force of employes under my control.

In this report I will state, briefly, the work accomplished in the several counties of this division, during the year, in the order as above named.

Monroe County.

The large and important city of Rochester, and the several large towns and villages in this county, have required the services of myself and the subordinate officers under my charge the greater portion of the time during the year in inspecting dairy products and vinegar offered or kept for sale on our markets and in taking the requisite samples of such products for analysis; and also in attending to the general business of the department.

I am not aware of any special matter that has occurred of importance during the past year, out of the usual routine of the business of the department.

I may state here that Mr. Perry, one of the officers of the department, reported to me, early last spring, that he had learned that a herd of valuable Jersey cows, upon a dairy farm in the town of Irondequoit, in this county, the milk of which herd had

been sold in the city of Rochester for general consumption by the citizens, had tuberculosis. I directed him to visit the farm, and he found that the milk was not being used and that the cattle were being destroyed. They slaughtered during the summer not less than nineteen of that one herd, under the direction of Dr. A. Drinkwater, one of the most skillful and competent veterinary surgeons in this vicinity. Mr. Perry also learned that some dairy cows in the towns of Brighton, Pittsford and Wheatland were afflicted with the same disease, and by the direction of Dr. Drinkwater all the animals suffering from the said disease were killed. By this heroic treatment I am convinced that this dread disease has been entirely stamped out in this county, and I am also satisfied that no portion of the milk from any of these herds had been used. This disease is not only conveyed from one animal to another, but it is believed that human beings may contract the same by using the milk furnished from the diseased cows; hence we have been very energetic in preventing the use of such milk by any person. Since the discovery of this disease in the above-mentioned towns, I have given the subordinates strict orders to make inquiry in all the other counties of this division, in order to ascertain whether any cases of such disease existed, and, so far, I have been unable to learn that any others were suffering from tuberculosis or any other disease, the animals all showing extreme good health.

During the past year several persons residing in this division have made complaint to me of the poor quality of some of the butter sold in our markets, expressing, in every instance, the belief that oleomargarine, or some other imitation of butter, had been sold them. On learning from them severally at what places they had purchased the butter complained of, I caused a few samples of such butter to be procured for the purpose of thoroughly testing the qualities of the same. Two of such samples were found to be suspicious, and I caused them to be delivered to the chemist for analysis. Upon such analysis being made the chemist reported that he found them to be butter, but of very poor quality, and that no foreign matter had been added in either case.

We have not been able to detect or find any oleomargarine or butterine, or other kind of spurious or imitation butter, offered

for sale or in the possession of any person in this division during the year, although very frequent inspections of the butter offered for sale have been made and every effort put forth to discover the same. I believe that the trade in such goods has been effectually eradicated in this section of the State.

The business of making butter and cheese in this county for the general market is, comparatively speaking, quite light, there being but one creamery or butter factory and but one public cheese factory in operation this year.

The creamery referred to is known as "The Jersey Creamery," at Scottsville, in the town of Wheatland. This factory was established by Isaac Budlong, Esq., about two and a half years ago, and he has owned and operated the same continuously since. It is managed with great care, under the immediate supervision of the proprietor. The cream supplied to this factory, to be made into butter, is produced from the milk of more than 200 very excellent cows, twenty-five per cent of them being pure Jerseys and the balance are short-horns and grades. The product of the creamery is nearly all sold in the city of Rochester, a small portion, however, being sold for immediate home trade. The business of this creamery has largely increased during the year. Our experts visited the farms, barns and stables where the cows that furnish the milk for this creamery were kept, and in every instance found them in good order, the cows well fed, carefully cared for and in excellent condition.

The creamery formerly known as the Genesee Valley creamery, at Wheatland, in this county, mentioned and described in former reports, was abandoned some two years ago, the machinery, tools and other appliances having been sold and removed.

The only cheese factory operated in this county is known as the Mendon cheese factory, situated in the town of Mendon. This factory manufactures full-cream cheese for the home trade, nearly all thereof being sold in the city of Rochester; a small portion, however, is sold each year for home consumption at the factory. The State brand is not used at this factory, for the reason, as stated by the cheesemaker, that they do not deem it necessary to use the State brand for their trade, as their cus-

tomers have long been taking their cheese and know the quality thereof. This factory produces, on an average, about 350 pounds of very good cheese, each day of the cheese season which is usually of six months' duration in each year. It is well managed and is kept clean and in good sanitary condition. The experts, in visiting and inspecting it, were informed by the cheesemaker in charge that no complaint could be made of their patrons, as the milk supplied was uniformly of good quality, clean and sweet, but should it be otherwise in the future, he would inform us thereof. The officers gave the cheesemaker our address and informed him that upon complaint being made to us at any time of any irregularity or any thing suspicious, that any patron was tampering with his milk, the matter would be given immediate attention and the offender, if detected, would be prosecuted.

I regard the milk supplied to our citizens, for family use, as good, and as regards the same I am pleased to report that but very few complaints have been made during the past year.

During the year the experts, when in the city of Rochester, have been continually on the alert, watching the numerous peddlers and dealers in milk, butter, cheese and vinegar, and making frequent inspection of such commodities offered or kept for sale. When any case arose which excited suspicion, a sample of the suspected article was taken for analysis. The whole number of samples of milk taken in the city of Rochester, during the year, and delivered to the chemist, Professor Lattimore, to be analyzed, was thirty-four, of which nine proved to be adulterated. These adulterated samples were taken from seven different milk peddlers; two samples each having been taken from two of them.

In regard to the disposition made of the cases of the several parties whose milk proved to be adulterated, as above stated, I prosecuted one of them in the police court of the city of Rochester. From this man we had taken two samples which proved to be adulterated, but owing to the slight degree of the adulteration and other extenuating circumstances, and at the urgent request of several reputable citizens of Rochester, who were customers of this offender and who

severally stated that they believed him to be an honest man and that the milk he supplied them was uniformly good and satisfactory to them, several of them having dealt with him many years, I deemed it advisable to discontinue the prosecution after the offender had been arraigned in court and had been very severely reprimanded by the police justice.

The other six cases, not prosecuted, remain in abeyance; the parties against whom these several cases have accrued having offered many excuses and extenuating circumstances, and upon inquiry and after consultation with the experts, finding that the milk in nearly all these cases was but slightly adulterated, I thought it advisable to let them rest. I think the ends of justice and the enforcement of the dairy laws were best subserved by cautioning the several persons in regard to their observing the law in every respect, which they severally promised most faithfully to do.

The work of visiting and examining the cows furnishing the milk for the consumption of our citizens, their food and housing, their sanitary condition and the condition in which the cow-barns are kept, has been faithfully performed, and I am pleased to say that in nearly every instance they were found to be satisfactory. In some few instances, where the experts found the condition of affairs in any way unsatisfactory, they advised the parties to see to it that needed improvements were made at once, which has been done.

We have given considerable attention to the inspection of butter, cheese and vinegar. There are several vinegar factories in this county. One of the largest in this State is located in the city of Rochester, and there are several others of less capacity. A large amount of vinegar is annually manufactured by them. With the aid of the experts of the Dairy Department, we have been able to give, and have given, a great deal of attention to the inspection of vinegar. The inspections of milk offered by milk peddlers and dealers in milk are usually made early in the morning and finished, as a rule, before midday, hence we have time to attend to the office work and other matters requiring attention, and yet give considerable time to the inspection of vinegar

factories and their product, made and kept in stock by them; and also to visit the grocery houses and stores dealing in dairy products and vinegar.

During the year we have visited, several times, every cider vinegar factory in this county. Upon these visitations we have carefully inspected and tested the quality of the vinegar manufactured by them severally, and have found them making and selling, in every instance, an excellent quality of standard goods.

We have, also, during the year, visited, many times, every wholesale grocery house and nearly every retail grocery store in the city of Rochester, and the grocery houses, stores and places of business where dairy products and vinegar are sold, in all the principal towns and villages within this county. Upon these occasions we have carefully inspected the butter, cheese and vinegar kept for sale by them, severally, and when we found any of them dealing in fluid milk, we have carefully inspected the same in every instance. I am much pleased to be able to report to you, that, as a rule, we found all said grocers and dealers in dairy products and vinegar selling standard goods. Of course, we occasionally found poor butter, yet it was pure and unadulterated. We also, in a few instances, found poor, hard, dry and crumbly cheese, which was claimed to be full-cream, but no adulterated cheese was found. At a few of the retail grocery stores in the city of Rochester, where they sold fluid milk, we found milk that was not, apparently, up to the standard. In these few cases we admonished them, severally, that if upon future calls at their places of business, we found them offering for sale or keeping for sale, milk which was suspected of being below the required standard, we should take samples of the same for analysis, and if, upon such analysis, the milk was found not to be up to such standard, we should be compelled to prosecute them. The several parties so admonished promised to see to it that care would be taken thereafter in that respect, and upon subsequent visits our experts found no cause for complaint.

As to the vinegar kept for sale at the various places, we found that nearly all, kept for sale as cider vinegar, was good

and of standard quality. Whenever we found vinegar, at any of these places, which was not of standard quality, the several parties claimed it was purchased by them of farmers in their vicinity, and, as it was impossible for us to ascertain at what time the vinegar was made, we did not deem it advisable to take samples of any of them. We advised the dealers that thereafter they must obtain and keep for sale only standard vinegar. We also found upon these visitations to grocers and dealers that in many places in the city of Rochester, and in a few places in the country towns and villages of this county, vinegar called "malt vinegar" and grape vinegar, made in imitation of cider vinegar, was kept in stock and sold. The experts called the attention of the several parties dealing in such vinegar to the provisions of the vinegar law, at the same time informing them of the necessity of keeping for sale standard goods, so as to avoid the fines and penalties which would thereafter be inflicted for violations of the same.

Nearly all dealers in vinegar also keep and sell an article called "white wine" vinegar.

Mr. A. S. Delano and Mr. Hoffman Ruger, vinegar experts, residing in Orleans county, have called upon us several times during the year and have rendered valuable aid in investigations.

The wholesale dealers in vinegar, at Rochester, when offered new supplies, send for us to examine and inspect the same for them before purchasing, which we have always done.

We have not been able to give as much attention to the towns and villages of this division as desired, yet we have visited the more important ones and have inspected the milk offered for sale, and have made inquiry of the citizens of those places as to the quality of the milk supplied them for use. Upon such inquiry it was learned that the consumers of milk in those towns and villages were satisfied with the quality furnished them and had no cause for complaint, hence it has been assumed that the persons dealing in milk in such towns and villages are, and have been, dealing with their customers honestly and furnishing them pure and wholesome milk.

When the fact is taken into consideration that many thousands of cans of milk have been inspected by us in the city of Rochester and the towns and villages of this division, during the past year, samples taken for analysis whenever the slightest suspicion arose upon inspection, or when complaints have been made, and that only nine of those samples proved, upon analysis, to be adulterated and these showed but slight adulteration, I think we may conclude that the milk supplied to the citizens of this division is, as a rule, excellent.

Ontario County.

In this county, the three creameries and one cheese factory, mentioned in my report of last year, are still in successful operation. These several creameries are known as the "Stanley creamery," of Stanley, in the town of Seneca; the "Sanitarium creamery," of Clifton Springs, in the town of Manchester; the "Crystal Springs creamery," of Port Gibson, in the same town, and the Naples cheese factory in the village of Naples.

Mr. Rice Macauley, butter worker at the Stanley creamery, reported to the experts, when visiting the factory, the following: Number of pounds of butter made the past year, 70,000; number of patrons, 149; the above being an increase of twenty-five per cent over the previous year. The factory is run on the cream-gathering system, and the business has been satisfactory to the management from a financial point. The condition of the creamery when visited was excellent.

The Sanitarium creamery, at Clifton Springs, has not increased their output in any appreciable amount over last year, the butter being principally used at the sanitarium, at Clifton Springs. Mr. A. S. Cotton is in charge and has, under his immediate supervision, 250 cows, mostly Holsteins. These cows are kept and fed under cover the year round, Mr. Cotton stating that, in his opinion, this was the most profitable way of doing. The arrangements at this creamery are complete in every respect and the conditions, when visited, could not be improved.

The Crystal Springs creamery, at Port Gibson, is owned and operated by Mr. J. W. Parker. This is the largest creamery in operation in this county, producing over 100,000 pounds of creamery

butter per season, there having been no decided increase during the past year. The butter made is principally sold to merchants in Rochester and the prices realized have been very satisfactory to the management and patrons. The factory is well managed and was found to be in a clean and wholesome condition.

The cheese factory at Naples, produces about 150 full-cream cheese daily, using the milk of 175 cows, or thereabouts. The quality is good, the factory neat and clean and the product is sold to home trade. There are twelve patrons interested, the factory being run on the co-operative plan.

I have not been able, with the limited force under my charge, to make as thorough an examination of the cheese, butter, milk and vinegar sold in this county as I could wish; however, the experts have examined the supplies sold at the different towns and villages they have visited while inspecting the butter and cheese factories, and in all instances found the articles mentioned to be pure and of a standard quality, so that there has been no necessity for their taking samples officially; and upon every occasion, upon inquiry of the citizens of the different towns, they have expressed themselves as satisfied with the products sold to them.

In this county are situated the large towns of Canandaigua and Geneva, and while, as above stated, I have not been able to as thoroughly inspect them as I could wish, I hope to be able to give them such examination in the near future as their commercial importance warrants.

The vinegar manufactories in this county are mostly small, the manufacturing being principally done by farmers on a small scale, there being but one factory of importance, which is located at Canandaigua. The experts have examined the product of this factory a number of times and in each case found the same to comply with the law.

Seneca County.

In this county there are no butter or cheese factories in operation at the present time, the factory formerly running and manufacturing butter and cheese, not having, as yet, got into operation, although it is but a question of a short time, as we are informed, when it will again be running at its full capacity.

There has not been as thorough an examination of this county as that of last year, owing to pressure at other points, still I do not think there has been any harm in this instance, through the inability to inspect the different towns of this county oftener, since the merchants and venders of milk have become so thoroughly imbued with the importance of the law and are so greatly interested in trying to sell nothing but lawful goods that I am satisfied that if anyone should try to sell any spurious article I would be immediately informed of the same.

In my last annual report a detailed account of the difficulties between one A. R. Button and Andrew Kinnits was given, with a statement that the matter of a bad sample of milk had been left with the attorneys of the department for this division for prosecution. Suit was commenced for a penalty in the Supreme Court, and, after several adjournments, the case came to trial before Justice Adams, of this judicial district, at a term held at Ovid, Seneca county, the latter part of September last, upon which trial the justice directed a verdict for the defendant. The following facts, among others, were brought forth upon the trial: Button owned a farm in the town of Seneca Falls, which he let to Andrew Kinnits, by virtue of a written lease under which he was to sell the milk produced upon the farm and divide the proceeds with Mr. Button. These facts were known to us, and upon the strength of them the suit was begun, but the additional fact was brought out, by the testimony of Messrs. Button and Kinnits, that subsequently the lease had been modified by a verbal agreement between the principals, to the effect that Mr. Kinnits was to divide the milk and deliver the one-half belonging to Mr. Button at his house in the village of Seneca Falls. This was being done at the time of taking the samples, and upon these facts, although we had no knowledge of them previously, the court held that there was neither a sale or exchange, nor an exposing for sale or exchange, of adulterated milk, and directed a verdict in favor of the defendant.

The vinegar inspected upon the various occasions of the experts visiting this county, was found to be of good standard quality, fully complying with the law in every instance.

Wayne County.

In this county there are, in successful operation, three creameries and three cheese factories.

The creamery known as the Macedon creamery, situated in the town of Macedon, is the most important one, having made about 50,000 pounds of first-class creamery butter the past year, being an increase over the previous year of about twenty-five per cent. The factory is owned by W. D. Herndeen and is run on the cream-gathering system.

The Sodus creamery is owned and run by Mr. A. J. Rice and under his immediate supervision. Mr. Rice has increased the output about 100 per cent in the past year, having made over 18,000 pounds of very good creamery butter, most all of which was sold in Rochester at prices which were satisfactory and profitable to all interested parties. Mr. Rice has upon his farm twenty high-grade Jerseys, the cream from which is used in his factory.

The Williamson creamery, located in the town of the same name, has been successfully operated during the past year, having increased its product about thirty per cent. The factory is owned by Mr. Edwin Baker and the work is done under his personal direction. The condition was excellent upon each visitation of our experts.

The cheese factory known as Montana, located in the town of Butler, has been in successful operation. There has been no increase in the product nor has Mr. Montana had any occasion to require the assistance of the experts, he being fully satisfied with the quality of the milk delivered at his factory. The experts have visited the factory on three occasions and in each instance found the same in excellent condition, it always being clean and wholesome.

A repetition of the foregoing would fully apply to the cheese factory located in the town of Walworth, known as the Lincoln cheese factory; everything being found the same as at Montana's.

The Red Creek cheese factory, located at Red Creek, town of Huron, is run and managed by a stock company. The experts have visited this factory a number of times this season, upon complaint of the cheesemaker, and upon one occasion took three

samples of suspected milk, two of which, upon analysis, proved to be bad and below the standard. The cases were referred to the company for settlement. Following all precedents in such cases, I assume a settlement has been reached, although the company has not, as yet, notified me of the same. This factory is in charge of Mr. O. E. Strough, who makes all the cheese and has full charge of the same. Mr. Strough reports an increase in the business of about thirty per cent the past season, also that a better price has been received than the previous year, owing to the splendid quality of the cheese made. Invariably upon our visitations we have found the factory and all machinery and utensils used in the very best condition.

The experts have also, upon various occasions during the year, visited the large and important villages of Lyons, Clyde, Newark and Wolcott, as well as the smaller villages, to inspect milk, butter, cheese and vinegar sold in the several places mentioned. They have made inquiry of the different citizens met, as to the quality of the same and uniformly received the answer that they could not find fault with any articles sold them; the inspections showing in all cases lawful goods.

At Newark, in this county, there is a very large vinegar works in successful operation, the works having been completed last year. The proprietors are Duffy, Mountford & Green. Our experts have visited this factory several times during the year and were given every facility by the proprietors, who are very affable and intelligent gentlemen and appeared to thoroughly understand their business, inviting them to go through their works and fully and carefully examine the same, and we found the factory to be fully equipped and in perfect order. The goods manufactured by them was found to be of standard quality, the factory turning out about 125 car loads or 7,500 barrels of first quality vinegar this season.

Yates County.

Our experts have visited this county twice this year and, on each occasion, made a thorough examination of all goods sold coming under the dairy laws, not finding any suspicious articles on sale.

Penn Yan is the only large village in this county; for this reason special attention was paid to it on these visits.

There were no butter or cheese factories in operation in this county the past year, nor are there any vinegar factories located within its limits, the vinegar sold being principally made by farmers in a small way.

I also report that the complaint sent by your office to me, and coming from the North Victory cheese factory, located in Cayuga county, was immediately investigated, Expert Perry visiting the factory and taking two samples, both of which, upon analysis, proved unlawful and below the standard. I referred the adulterated samples to the factory for settlement, as I did in the Red Creek factory case. They reported that the cases were settled by the accused parties paying an amount (to me unknown) into the treasury of the company, and therefore I have taken no further steps in the matter.

Before closing this report, I desire to state that the subordinate officers of the department, under my charge, while visiting and inspecting the various cheese and butter factories located within this division, have, by my directions, given notice to each that we are at all times ready and desirous to assist them in any and all ways within our authority, upon such request being made, said officers giving their address. They have also informed all dealers and peddlers in milk and other dairy products, throughout my jurisdiction, to the same effect. All wholesale houses, retail stores and other business places dealing in milk, butter, cheese and vinegar, have been informed that, upon complaint to us of any irregularity or suspicion arising as to any of their vendors of whom they obtained their supplies, we would immediately investigate the same, and, if found to be well grounded, we would take steps to prosecute the offender. Private citizens have been questioned as to the quality of such articles supplied to them, and the officers have notified them that we would be glad to answer any call upon us when any thing suspicious was discovered, the officers also giving their address in such case.

The officers, while making their visits to the various cities, towns and villages throughout this division, have found that

the milk supplied to the citizens for general consumption has been largely supplied by farmers living in the near vicinity, though in nearly every town and village there are a number of citizens, keeping from one to three cows, who have been in the habit of supplying neighboring families with milk and cream. In such cases, upon inquiry being made, it has been found that such families were well satisfied with the articles supplied, they stating there was no ground for complaint, the milk and cream being uniformly good.

I am pleased to be able to report the dairy interests to be in a satisfactory condition in this division of the department, and, in closing, I desire to express my personal satisfaction with the assistance so ably rendered me by the subordinate officers under my immediate supervision.

Kindly thanking you for courtesies extended to me in the past, I respectfully submit this report.

JOHN H. FOLEY,
Assistant State Dairy Commissioner.

Report of George J. Zillig.

Hon. J. K. BROWN, *New York State Dairy Commissioner, Albany, N. Y.:*

I hereby submit my report of the transactions of the Dairy Department for the ninth division, comprising the counties of Erie, Niagara and Orleans, for the year ending September 30, 1892.

The Dairy Department has become an established institution, whose objects are well known, and the laws under which it operates are respected and generally obeyed. By its work some of the greatest evils which menaced the good health of the whole people have been eradicated.

The long and toilsome journeys for inquiry and espionage, the performance of the disagreeable duty of complaints against and prosecution of many who have unwittingly violated the law, has been reduced to a minimum. All interested parties now know the law, and are aware that they are closely watched and will be promptly prosecuted if found to be offenders.

The department is now effective in preventing violations of the law, thus making the necessity of prosecutions less frequent.

As the business of dealing in adulterated food products was apparently profitable, before the State took means for its suppression, it is but natural to expect a return of the evil with a relaxation of vigilance on the part of the department.

Feeling certain that this would be the result in my district, I have had the experts attached to this office give particular attention to inspections of products shipped to the cities or sold by stores and peddlers.

As I have heretofore stated in my report, it is physically impossible to cover all of the territory of this district, or to inspect all of the products, with the force at my command.

Milk Inspection.

The largest part of the milk sold in the city of Buffalo by peddlers is procured by consignors in the country towns adjoining the city. While there is a possible adulteration before shipment, we are satisfied that the temptation is greater to adulterate the milk after it has passed into the hands of the consignee.

Samples are, therefore, taken from wagons in the early morning and brought to the office for test. Few violations were found this year which required the department to exercise its extreme powers. We have endeavored to exercise that judgment which, while requiring full compliance with the law, would not unjustly accuse a dealer of wrong-doing.

Climatic conditions, the ageing of cattle, and some temporary conditions, may show a difference in the gauge of the milk from the same cow on different days. The standard may range above the average in some components of milk and below in others.

The stand the courts have taken of late, require more than this to convict an offender and I have always avoided taking cases into court, unless the proof was sufficient for conviction in the court by the rule they have heretofore laid down.

Frequency of inspections, and warnings given to suspected offenders, will be effective in keeping the law enforced, while the loss of a case in court gives encouragement to violate it.

The number of inspections of milk from wagons, made by this office the past year, amount to 2,666.

In 238 cases, warning was given the dealers that the milk must reach a higher average, and subsequent investigations showed the necessary improvement in quality.

Three hundred and twenty-three samples were given to the chemist for analysis, and upon his report I based my subsequent action in the cases.

As a rule, the consumers of this district are getting a good quality of milk and feel secure in the protection this department affords them.

Milk Received by Rail.

As stated, the greater portion of milk consumed in the city of Buffalo is received by rail. The amount is annually increasing and now milk trains are a specialty on every road. The older

dealers almost invariably ship good milk, because of the lesson a few prosecutions have afforded and because they find it is otherwise profitable. Occasionally a new shipper, unacquainted with the requirements of the law, or the demands of consignees and consumers, is careless and indifferent, and for such people, especially, this department is ever on the outlook.

Notwithstanding that the places for unloading and delivery are different for each railroad, the experts have done a remarkably large amount of work in securing samples. This work has to be done in a limited space of time, morning and evening, and done quickly, as the shipment is the collection from a large number of farmers who each have a product of only from two to five cans daily. The product of each farmer has to be tested, to properly locate an offender. The consignee being at the depot on the arrival of the consignment to take it away, no time can be wasted by the experts.

The number of samples taken and tested at the depot was 6,392.

The lactometer and cream-gauge test shows that the greater part of these shipments are of pure, high standard milk. Some of the samples, however, must be submitted to the greater test of chemical analysis.

The best milk which reaches this market goes to the large hotels and restaurants and to a few dealers who have the best trade of the city.

The demand for milk has caused many farmers to make this their special business, and they have equipped themselves for the best results from the dairy.

As a result, the product from this source is of a good average and far above what it was in former years.

The receipts of milk by rail the past year is as follows:

TABLE SHOWING AMOUNT OF MILK RECEIVED BY RAIL IN THE CITY OF BUFFALO THE PAST YEAR.

	N. Y. C. R. R.	B. R. & P. R. R.	N. Y. L. E. & W. R. R.	B. & S. W. R. R.	W. N. Y. & P.	W. S. R. R.	D. L. & W. R. R.	Total.
October	42,900	33,998	88,698	5,748	144,749	59,803	25,773	.....
November.....	42,654	32,406	82,908	5,394	134,907	60,928	24,119	.....
December.....	42,411	33,737	48,256	5,398	113,354	62,196	25,214	.....
January.....	42,618	34,219	78,458	4,923	120,914	62,438	25,615	.....
February	41,215	33,831	88,838	5,473	114,767	59,933	24,919	.....
March.....	42,000	32,908	89,762	5,725	141,261	65,000	24,217	.....
April	43,020	33,907	93,438	6,540	150,084	64,967	26,806	.....
May	43,115	33,216	93,122	6,352	155,135	63,637	25,111	.....
June	42,319	34,515	95,036	8,166	173,337	67,718	25,900	.....
July.....	43,416	35,616	93,228	7,976	156,149	66,035	25,906	.....
August.....	43,919	35,932	89,871	4,100	160,422	66,100	25,815	.....
September	42,938	34,712	91,633	6,461	136,536	62,680	25,615	.....
Gallons.....	512,585	407,517	1,028,236	72,061	1,671,675	761,470	304,669	4,737,675
Cans	64,073	50,940	128,533	9,008	208,960	95,164	38,009	594,709½

Cheese Factories and Creameries.

The number of cheese factories and creameries in this district remains about the same. Cheese-making has become a great industry, and the factories are conducted on the co-operative plan.

The patrons are evidently understanding that the best returns come to them from the best results at the factory and that each has an interest in supplying only the best milk that the output may be of the best quality and command the highest price in the market.

As a consequence, the samples taken by our inspectors show a generally good rate of milk which, we are inclined to believe, comes from keeping better stock and giving them the best of housing and care.

The co-operation of the managers with this department has prevented violations of the law. They being interested in having the best results, seek the best and purest ingredients and are on the alert to discover any imposition or deception on the part of patrons. The latter, knowing this, cannot afford to run any risk in adulterating their milk.

We are occasionally called to a factory to take samples of milk and put them to test, and occasionally unannounced visits of inspection are made. The milk delivered has improved in quality since the Dairy Department commenced operations, so far as our observation and analysis shows, and less violations of the law have been detected.

The territory is very large, covering fifteen by fifty miles, and a continuous round of visitation is impossible; but we are enabled to go to principal points often enough to keep those interested always in expectancy of our coming, and thus, if inclined, few would risk adulteration.

Three hundred and eighty-six samples of milk have been taken when being delivered to factories, and all put to the lactometer test.

Butter and Cheese.

Butter and cheese inspections are made incidental to our other work. We have found little to complain of regarding the quality of these products sold in this district. A number of complaints

have been made, and samples taken, but in most cases they proved to be of poor, but not adulterated, butter.

Two separate complaints were received by us, from consumers in Lockport, that a prominent grocery firm was selling adulterated butter. Samples were taken and submitted to chemical analysis, and foreign matter to the amount of 29.63 per cent was found. These complaints were received August 23, 1892, and I have since been collecting evidence and otherwise perfecting my case to commence prosecution.

Our suspicion has also been directed to another locality, and we expect soon to procure the necessary samples and put them to a chemical test.

Vinegar Inspections.

The inspections of vinegar have been generally left to Expert Vinegar Inspector A. S. Delano. The experts have taken samples and, where found necessary, the cases have been referred to him.

The following is the report of Mr. Delano on his work in this district:

MIDDLEPORT, N. Y., *November 28, 1892.*

GEORGE J. ZILLIG, Esq., *Assistant State Dairy Commissioner:*

Dear Sir.—I have to report, for myself and Hoffman Ruger, Esq., vinegar inspector, that in our frequent examinations of the several vinegar factories in western New York, and the tests made by us of the cider vinegar produced and put on the market by said factories, not only at the places of manufacture, but in stock of wholesale grocers and jobbers of vinegar, we have almost universally found such goods fully up to the standard of purity and strength required by the statute of the State.

I believe that the law regulating the quality of cider vinegar is generally approved of by the trade, and that they acknowledge its benefits to them by its tendency to establish a uniformity of price, and a guarantee of quality which materially increases the volume of their sales by the confidence which it gives the honest retailer in his ability to furnish his customers a pure and wholesome article of condiment.

The large territory we have to cover utterly precludes the possibility of a thorough examination of the stock of each retailer of vinegar. Of the great number of retailers whose stock we

have been able to test, in various localities, we have found a general acquiescence in the justice and propriety of the law, but they insist on a thorough and general application of its provisions.

In this connection, I beg leave to renew the suggestion which I have heretofore made to you, "that the help in this department is inadequate to the proper guarding against infringement of the law by small dealers."

If you could have one competent vinegar inspector, who could devote his whole time to the city of Buffalo, with what assistance I could give him, we would be able to make a decided improvement in the trade there. And I would be able, with the aid of Mr. Ruger, to give more attention to the retail trade in the villages of the western part of the State.

Yours respectfully,

A. S. DELANO,

Vinegar Inspector.

Cows Kept in the City.

The condition of the cow stables in the city of Buffalo have been greatly improved, and less complaint has come from that direction than heretofore.

As a result, the milk is of better quality than heretofore sold by owners of these cows, and complaints generally have come from persons either misinformed or spiteful.

On October 6, 1891, on complaint made to us by Agent Wright, of the Society for Prevention of Cruelty to Animals, Inspectors Coughlin and Galligan, with Chemist Vendenbergh, investigated the charge that milk was being sold from a sick cow by Thomas Osborn, on Reese street, near the city line. One cow was found suffering from hoof-rot, and consequently, the owner of the animal was ordered to destroy all milk taken from the cow, which he agreed to do, and we are satisfied that he did so.

The number of samples taken of milk from cows kept in city barns was 1,802.

PROSECUTIONS AND CONVICTIONS.

Mr. William Armstrong, our attorney in this division, has been earnest and active in the prosecution of all cases.

The following is a report of the cases and results:

Fines.

The amount of fines collected for violations of the law on conviction was \$450, one-half of which was retained by the court, and the following amounts were forwarded to the State Treasurer:

1891.

Nov. 21.	Joseph E. Staple	\$12 50
	Agede Brown	50 00
	Charles Pattridge	50 00

1892.

March 11.	Charles G. Kleinfelder	12 50
	17. William W. Geiring	12 50
April 7.	August W. Struck	12 50
	11. Frank Vetter	12 50
	28. Charles Eaton	12 50
May 16.	Nicholas Sherer	12 50
	23. Alonzo Packer	12 50
June 6.	Samuel H. Fillman	12 50
		<hr/>
		\$225 00

Samples Taken.

The number of samples of food product taken the past year, in addition to the tests made at depots, was as follows:

Michael Galligan, butter	53
Michael Galligan, cheese	39
Michael Galligan, milk	1,292
Frank E. Geise, butter	44
Frank E. Geise, cheese	17
Frank E. Geise, milk	1,073
Samuel Abrams, butter	110
Samuel Abrams, cheese	32
Samuel Abrams, milk	832
John J. Coughlin, butter	62
John J. Coughlin, cheese	79
John J. Coughlin, milk	486
Robert C. Turner, butter	20

Robert C. Turner, cheese	41
Robert C. Turner, milk	419
George J. Zillig, butter	31
George J. Zillig, cheese	52
George J. Zillig, milk	110

Chemist's Report.

The following report of Chemist John A. Miller, on results of certain chemical analyses, presents facts of great importance, and is hereby given as part of this report:

NIAGARA UNIVERSITY, }
BUFFALO, N. Y., November, 1892. }

HON. GEORGE J. ZILLIG, *Assistant Dairy Commissioner, Buffalo, N. Y.:*

Sir.—I have the honor to report the results of some experiments which were made to ascertain the accuracy of analyses of samples of milk which had been allowed to become thoroughly sour.

The samples used were the official ones taken by the inspectors of the commission and brought to me for analysis. Immediately upon receipt of these samples the analysis of the sweet milk was made and the report forwarded to you. These samples were then allowed to stand for a certain length of time and then analyzed again.

The method of analysis used was as follows:

The thoroughly soured milk was neutralized with strong ammonium hydroxide—5 c. c. in each case being sufficient—0.5 grammes of pure sodium carbonate was then added, and after thoroughly mixing, the milk was cooled down to 15.50 centigrade. At this temperature, the specific gravity was taken by means of the Westphal balance.

The total solids were determined by evaporating 2 c. c. in a flat-bottomed platinum dish to dryness and drying to constant weight.

The fat was determined by the Adam's paper method, ether being used for the extraction.

The results obtained are as follows:

TABLE SHOWING RESULTS OF EXPERIMENTS.

NUMBER OF SAMPLE.	SWEET MILK.				SOUR MILK.			
	Specific gravity.	Water.	Solids.	Fat.	Specific gravity.	Water.	Solids.	Fat.
		Per cent.	Per cent.	Per cent.		Per cent.	Per cent.	Per cent.
3269	1.0301	89.00	11.00	2.86	1.0257	90.63	9.37	2.90
3734	1.0307	87.74	12.26	3.94	1.0274	98.21	10.79	3.57
3749	1.0319	88.30	11.70	3.08	1.0307	89.46	10.54	2.34
3750	1.0315	87.37	12.63	4.07	1.0271	88.92	11.08	4.28
3755	1.0314	87.62	12.38	3.83	1.0301	90.48	9.52	3.85
3765	1.0314	86.97	13.03	4.64	1.0199	88.30	11.70	3.96

In no case was it possible to obtain a perfect emulsion after the soured milk had been neutralized. A too violent or lengthy shaking easily converted the fat into butter, and these rendered it impossible to obtain results approximating in any way the true percentage of fat contained in the milk.

The results given above are those obtained from the most perfect emulsion which it was possible to obtain from the soured milk after it had been neutralized.

The conclusions to be drawn from these experiments are:

1. In samples of milk which have become thoroughly soured, it is impossible to obtain a perfect emulsion after neutralizing the formed lactic acid.

2. The results obtained for the total solids are lower than the true percentage of total solids contained in the milk. The percentage of fat may be lower or higher than the true percentage.

3. All the results, therefore, are untrustworthy.

Very respectfully.

JOHN A. MILLER, Ph. D. (Berlin),

Chemist.

Conclusion.

In conclusion, I desire to give expression to my appreciation of the courteous treatment received from the State Dairy Commissioner, Hon. J. K. Brown, and also of the faithful and conscientious work of the experts in this department, Messrs. A. S. Delano, Hoffman Ruger, John J. Coughlin, Michael Galligan, Frank E. Geise, Samuel Abrams and Robert C. Turner; also, to Professor John A. Miller, the chemist of the department, and William Armstrong, Esq., attorney, all of whom have performed their duties in a manner satisfactory to this department and to the best interests of the people.

Respectfully submitted,

GEORGE J. ZILLIG,

Assistant State Dairy Commissioner.

Report of James W. McMahon.

ELLCOTTVILLE, N. Y., *November 1, 1892.*

HON. JOSIAH K. BROWN, *New York State Dairy Commissioner,
Albany, N. Y.:*

I herewith submit my report as assistant Dairy Commissioner for the division assigned to me, viz., Allegany, Cattaraugus and Chautauqua counties. These three counties are undoubtedly the largest three dairy counties of the State, containing nearly 300 factories, which manufacture milk of about 80,000 cows. A very considerable quantity of milk is also shipped from these three counties into the city of Buffalo, and about twenty-seven creameries are in operation manufacturing butter. The cities of Jamestown and Dunkirk, and the growing towns of Olean, Salamanca, Randolph, Franklinville and Wellsville are embraced in this division. This large territory to be traveled, with the exacting duties, makes the work laborious, but it has been faithfully and impartially performed by the experts and all connected with this department in this division.

The force of experts was reduced in this division in March, 1892, at the command of the State Dairy Commissioner, to two experts, and the work in this division has been performed under difficulties, as very often complaints would reach me and it would be several days before we could so arrange as to get to the factory from which the complaint emanated.

Circumstances arise that create suspicion against parties, and it is only by repeated efforts on the part of our experts that detections can be secured or proof obtained that would convict them of violations of the laws; the territory is so great, and the factories so numerous, that for the proper patrolling and watching of the district more help is needed.

The patrons and proprietors of the factories are appreciative, and aid this department, at every opportunity, in the discovery of

adulterated milk and in the prosecution of offenders. Dairy laws are their protection, and the good results that have come from their enforcement show them the wisdom of their enactment as a protection to honesty and a menace to fraud and deceit.

Our experts have been vigilant and energetic in their endeavor to sample and test the milk at all the factories and of all peddlers in villages and cities, and no complaint of any kind or nature has reached us that has not been investigated. Nearly all of the factories in this division have been visited at least once during the year, and many of them oftener, the sanitary condition, location of whey-vats, etc., looked after, together with taking samples of milk at each factory. In some cases complaints by the patrons that they were not allowed to see the books of weights, etc., by the proprietors, have been received, but in every case I found the proprietors willing to obey the law, and ordinarily it was a misunderstanding between the patron and owner of the factory, that an explanation of the law settled.

The farmers' institutes have followed in the line laid down by this department in the way of intelligently discussing at their meetings the relative quality of different foods for cows, and the Babcock milk tester has been used at these meetings with good effect as showing plainly the difference in value of different cow's milk and the commercial values of different kinds of food as shown in the milk. The outcome of this study is highly satisfactory to the farmer. Cows that are barely self-sustaining are being turned off, the calves from the cows giving the greater percentage of high-grade milk are being raised, and the milk standard of the cows is being raised very perceptibly, both as to quantity and as to the quality of solids. As proof of this I point to decreased number of pounds of milk used to make a pound of cheese, as shown in the statements of factory owners, comparing this year with previous years. Better and more intelligent breeding makes better milk-producing cows; better and more intelligent feeding makes better and richer milk, and better milk takes a lower percentage to make a pound of cheese, and gives the farmer a better percentage for his labor.

I have investigated complaints made to this department as to stringy and deleterious milk, caused by cows eating some weed or plant, but in these cases have been unable to accomplish much, as such cases could be better referred to the health board.

During the past season Messrs. Morgan and Hall, cheese instructors connected with the Dairy Department, have visited our district and their work and instructions are highly appreciated by the factory owners and farmers, and has been productive of satisfactory results. In this connection allow me to reiterate the recommendation made by me last year, namely, that during the winter months, when farmers can give time to this branch of their business, that meetings be held under the auspices of the Dairy Department at the points most convenient for farmers, and that instructions be given by expert butter and cheese makers; that at those meetings the value of different food as milk, bone and flesh producers be subjects of inquiry and discussion; that the sanitary condition of the barns and surroundings be discussed, and that the milk of cows in different dairies be tested with the aid of such tester as the Babcock milk tester. I suggest this from the fact that, during the past season, we have tested the milk of different dairies, and find that the difference in some cases is very great, some dairies testing as high as five and four-tenths per cent fat, and others testing as low as three and five-tenths per cent. Now, in cases where we have tested the milk of single cows, we found the difference even more marked. Could this difference in the milk of different cows be clearly shown to the farmer the result would be beneficial in the introducing of improved strains of blooded stock, and the milk delivered at the factories and creameries would be more uniform in the percentage of solids, and the criterion would be a higher grade level, and justice would be given to milk rich in solids.

Objection has been raised by factory owners and patrons that the standard gauge established by law, below which good milk will not go, is too low, and that the existence of this standard means the encouragement of breeding cows for a flow of milk rather than for the quality; but the records of the factories this year, as a whole, hardly bear this view out, from the fact that

the percentage of milk used this year to make a pound of cheese is lower than ever in the history of cheese factories.

The number of factories visited this year was 168; the number of creameries was twenty-seven; the samples examined, including peddlers, was 3,786; the samples analyzed were twenty-two; samples found below standard by analysis, two; samples found below standard by Babcock tester, one. The sample taken and tested by Babcock tester was not analyzed from the fact that party acknowledged guilt and paid twenty-five dollars fine, which was remitted, one-half to State Treasurer and one-half to county treasurer. Of the other samples found below standard, conviction followed.

In the case of *The People v. John Hauck*, tried before J. K. Ward, justice of the peace; convicted and fined twenty-five dollars; one-half sent to county treasurer, one-half to State Treasurer. The other case is yet pending. The milk was entered at the factory in the name of the owner of the farm, although the owner of the said farm said it was without his knowledge or consent, and that the crime was committed by tenant or his (the tenant's) agents on said farm, and upon this statement of facts a warrant was asked for said tenant.

In several cases where samples were analyzed, the standard was below that which good milk would show, but not sufficiently lacking in solids to warrant me in commencing action. Sample No. 3292 showed, by analysis, water, eighty-seven and sixty-two-hundredths per cent; solids, twelve and thirty-eight-hundredths per cent; fat, three per cent; ash, sixty-nine-hundredths per cent; solids not fat, nine and thirty-eight-hundredths per cent. In this case those conversant with the analysis of good milk would recognize milk that was at least ten per cent less valuable than the ordinary milk delivered at the factory, yet not sufficiently below an established standard to warrant prosecution.

June twenty-ninth sample of milk was taken at Ashford, which, upon analysis, showed below standard. John Hauck was arrested upon warrant, convicted and fined. About two weeks after the conviction of said Hauck an expert was, at the request of the proprietors of the factory, again sent to the factory, and, upon

this occasion, said Hauck, discovering the expert as he attempted to get a sample, drove away from the factory and did not deliver milk there during the balance of the season.

In concluding this report, allow me to say that a visit to the factories by the experts is always productive of much good, even when all milk at factory shows good by lactometer test. I am in receipt of many letters from proprietors, as well as from patrons, acknowledging the valuable services rendered the dairy interests in this section under the dairy laws. The enforcement of these laws has been of incalculable benefit to the dairy interests, and this industry is to-day the most prosperous it has ever been in the history of the State.

The enforcement of the laws against the manufacture and sale of oleomargarine has made it possible for farmers to estimate to a great extent the demand for and supply of butter, and consequently farmers realize an average of at least twenty per cent more for the butter product than was realized previous to the enactment and enforcement of these laws. The proprietors and patrons of factories have uniformly aided us in the enforcement of the law, and, so long as the course of this department merits their approval, we can rely upon their aid in enforcing the dairy laws, which are their protection.

I have avoided giving any reasons for being charged with persecution in the discharge of my duties, and in all cases have asked and been awarded the co-operation of the factory owners and patrons in my work. The inspection of the different factories and creameries in this district is thorough, and the results satisfactory. Violations of the law are not numerous, and that fact shows the value of the work performed. Should the vigilance of the experts relax I am satisfied that a knowledge of that fact would lead to as bad a condition of affairs as existed previous to the enactment of these dairy laws.

Although much good has resulted through the vigilance of this department during the past year, I am satisfied that the future will show to a greater degree the value of this department, and the salutary effect of the enactment of these laws. I must extend to our chemist and experts, Walsh and Corbett, my thanks for their

activity and vigilance, and to yourself and those connected with this department, my gratitude for the aid and assistance that has always been extended me in the performance of my duty as assistant dairy commissioner.

Respectfully submitted,

JAMES W. McMAHON,
Assistant State Dairy Commissioner.

Report of G. A. Smith.

Hon. J. K. BROWN, *New York State Dairy Commissioner, Albany, N. Y.*

Sir.—I have the honor to submit the following report of the work performed by me as an instructor in dairy husbandry for the year ending September 30, 1892.

At the time I closed my last annual report, I was at work in Lewis county, making a test of the milk at several different factories with the Babcock fat test and then making cheese from the milk, and in that way trying to get some knowledge of the effect on the yield of cheese of different amounts of fat in the milk. The work was continued the first week in October; a partial report of the same was made in the last annual report. The second week in October, I made cheese at the experiment station at Geneva, a report of which was also published in the last annual report. The latter part of October I went to Plattsburgh to attend a farmers' institute held at that place under the auspices of the State Agricultural Society. This was the beginning of a series of meetings which were held in nearly every county of the State, the object of which was to give the farmers instruction in the improved methods which the experiment stations and progressive farmers had found to be a benefit.

The especial line of work that I gave talks upon was: Better care and feeding of milk cows to produce more and better quality of milk; the better care of the milk and utensils, so that the cheesemaker might make a finer grade of cheese; and the more careful handling of the milk and cream in making butter. This was especially intended to reach that class of farmers that only make a little butter in the spring and fall, before and after the cheese factory season, not doing very much at the business; they

have failed in many cases to realize the difference in the quality of the butter that they make and what the consumer requires when he pays a fancy price; consequently, they have not given in that care and attention that it must have to make fancy quality; making butter and trading it at the store for groceries where it is all dumped together, is not conducive to an improvement in quality.

My time was taken up with this work until April, when the factories started, and I commenced visiting them, and giving instruction in the same line that we had done the year before. Having a large number of calls to test milk with the Babcock machine, at the time, I thought that it would be a good plan to keep a record of the variations in percentage of fat between hay and dry food, and the same cows after they were turned out to grass.

As you know, it is held by some people, that the percentage of fat in an individual cow cannot be changed by any method of feeding; that while the quantity of milk can be changed very largely, the per cent of fat will remain the same. The work that I submit a report of covers the time from the last of April until the first of June, when the milk had nearly doubled in quantity and, as the report shows, the fat had increased in most cases quite a little.

Test of eleven cows between May first and June fifth:

		May 1. Per ct.	May 7. Per ct.	May 14. Per ct.	June 5. Per ct.
Number	1	3.4	3.2	3.8	3.8
Number	2	2.7	3.8	4	4.4
Number	3	2.8	3.2	3	4
Number	4	3	3	3.5	4.1
Number	5	3	3.2	3.4	3.7
Number	6	3.4	3.2	3.4	4.2
Number	7	2.5	2.4	2.8	3.6
Number	8	3.4	3.1	3.6	4
Number	9	2.9	3	3.2	3.8
Number	10	3.4	3.2	3.4	3.7
Number	11	3.4	3.6	3.6	4.2

Test of factory in Schuyler, Herkimer county, for four weeks, showing the change from hay to grass.

		April 30. Per ct.	May 7. Per ct.	May 14. Per ct.	May 21. Per ct.
Number 1	.....	3	3	3.2	3.6
Number 2	.....	3	2.8	3	3.6
Number 3	.....	3.2	3.1	3.4	3.8
Number 4	.....	3.6	3.4	2.8	4.4
Number 5	.....	3.2	3.1	3.6	3.8
Number 6	.....	3.5	3.4	3.3	3.9
Number 7	.....	3.2	3.3	3.2	4
Number 8	.....	3.4	3.6	3.8	3.9
Number 9	.....	3	2.8	2.6	3.8
Number 10	.....	3.3	3.2	3.4	4
Number 11	.....	3.4	3.4	3.4	4
Number 12	.....	3.2	3.1	3.4	4
Number 13	.....	3.4	3.5	3.7	4.5
Number 14	.....	3.1	3.1	3.2	4.2
Number 15	.....	2.6	2.8	3.2	3.7
Number 16	.....	3.2	3.4	3.2	4
Number 17	.....	4.2	4	3.6	4.2
Number 18	.....	3.2	3.2	3.4	4
Number 19	.....	3.4	3.4	3.8	3.8
Number 20	.....	3.2	3.5	3	4.1
Number 21	.....	3	3.4	3.2	3.6
Number 22	.....	3.3	3.5	3.3	4.2
Number 23	.....	3	2.8	3.2	3.9
Number 24	.....	3.2	3.5	3.7	3.8
Number 25	.....	3.2	3.2	3.4	4.3
Number 26	.....	3.1	3.4	3.2	4.2

Test of patron's milk, factory in Madison county, May 21, 1892:

	Per cent.
Number 1	5.2
Number 2	4.4
Number 3	4.4
Number 4	4.7

	Per cent.
Number 5	4.3
Number 6	3.7
Number 7	3.7
Number 8	3.4
Number 9	4.1
Number 10	3.4
Number 11	3.9
Number 12	4.0
Number 13	3.7
Number 14	3.8
Number 15	4.4
Number 16	3.2
Number 17	4.6
Number 18	4.2
Number 19	5.2
Number 20	3.4
Number 21	3.9
Number 22	3.5
Number 23	3.3
Number 24	5.0
Number 26	3.6
Number 27	3.3
Number 28	3.8
Number 29	3.7
Number 30	4.2

Test of factory in Lewis county, June 14, 1892:

	Per cent.
Number 1	3.9
Number 2	4.0
Number 3	3.6
Number 4	3.9
Number 5	3.8
Number 6	3.8
Number 7	3.8
Number 8	3.7

	Per cent.
Number 9	3.5
Number 10	3.7
Number 11	4.0
Number 12	3.8
Number 13	3.7
Number 14	4.2
Number 15	3.5
Number 16	3.8
Number 17	3.8
Number 18	3.8
Number 19	3.8
Number 20	3.9
Number 21	4.2
Number 22	4.1
Number 23	3.7
Number 24	3.9
Number 25	3.7
Number 26	3.2

The first of May, we commenced on a series of tests in making cheese in co-operation with the experiment station at Geneva; this was a continuation of the work begun at the station last year, a report of which was made in the last annual report. It was planned to do one week's work at the station, and one at some factory, each month during the season; this plan we have been able to carry out, the result of which I take from the bulletins at the station. The first work of the season was at the factory of Mr. G. Merry, Verona, Oneida county, the first week in May, and at the station the last week in May; the following is the test of the dairies at Mr. Merry's, and the amount of milk that they gave at that time:

	MAY 3.		MAY 4.		MAY 5.		May 6.	
	Pounds of milk.	Per cent of fat.	Pounds of milk.	Per cent of fat.	Pounds of milk.	Per cent of fat.	Pounds of milk.	Per cent of fat.
No. 1.....	210	3.4	205	3.1	213	....	220	3.2
2.....	54	3.6	51	3.2	52	4.0	50	3.0
3.....	115	3.4	115	3.1	112	3.2	120	3.4
4.....	74	3.0	74	2.8	75	2.2	76	2.9
5.....	103	2.8	107	2.8	101	3.0	103	3.0
6.....	98	3.6	98	3.3	102	3.8	103	3.4
7.....	94	3.0	96	3.0	91	2.6	101	3.0
8.....	112	3.5	112	3.2	101	3.6	102	3.4
9.....	160	3.4	157	3.3	160	3.4	166	3.2
10.....	100	3.1	102	3.0	104	3.2	120	3.4
11.....	86	3.2	80	3.0	82	3.3	75	3.6
12.....	230	3.2	227	3.1	250	3.2	232	3.4
13.....	52	3.8	53	3.6	55	3.7	54	3.5
14.....	165	3.6	164	3.4	156	3.4	154	3.6
15.....	196	3.1	203	3.2	206	3.2	202	3.0
16.....	150	3.0	160	2.8	160	2.7	180	2.9
17.....	150	3.6	147	3.5	146	3.4	141	3.7
18.....	121	3.2	122	3.2	118	3.2	115	3.1
19.....	84	3.0	84	3.2	78	3.4	78	3.0
20.....	357	2.8	357	2.8	356	2.8	359	3.0
21.....	204	3.2	207	3.2	205	3.2	205	3.2
22.....	198	3.2	200	2.8	210	2.9	229	3.0
23.....	70	3.0	70	3.0	71	3.4	72	3.6
24.....	144	3.4	153	3.0	161	3.2	157	3.4
25.....	225	2.2	225	3.0	245	3.4	248	3.1
26.....	150	3.2	152	3.1	160	3.6	160	3.4
27.....	375	2.6	385	2.8	394	2.8	388	2.8
28.....	89	3.2	90	3.2	91	3.1	104	3.2
29.....	480	3.5	474	3.6	490	3.6	464	3.6
30.....	145	3.2	150	2.8	148	3.0	150	3.0
31.....	224	3.0	220	3.2	206	3.2	218	3.2
32.....	140	2.9	130	3.0	108	3.0	118	3.0
33.....	350	3.4	351	3.0	360	3.0	359	3.2
34.....	410	3.1	415	3.0	414	3.0	422	3.2
35.....	165	3.3	166	3.2	172	3.2	183	3.1
36.....	323	3.1	312	3.3	319	3.4	314	3.4
37.....	305	3.6	305	3.4	300	3.4	312	3.4

No. 27 is a twenty-five cow dairy; poor condition; feed hay, sweet corn, silage, and about four quarts middlings daily. No. 20 is a twenty-two cow, dairy; fair condition; feed hay, cut on swampy land, mostly wild grass, and about three quarts shorts daily. No. 13 is a dairy of three cows; good condition; feed hay and about eight quarts corn-meal and middlings. No. 29, twenty-four cows; first-

class condition; feed hay and about eight quarts of corn-meal and middlings with a few oats ground and mixed in. The best work was at the factory of W. C. Stone, Mannsville, Jefferson county, the first of June.

Following is the fat test of the different dairies at that time and of the work there and at the station in June.

Test of milk at Stone's factory, Mannsville, June 2:

	Per cent.
Number 1	4
Number 2	4.8
Number 3	3.4
Number 4	3.7
Number 5	3.7
Number 6	4
Number 7	3.9
Number 8	4
Number 9	3.6
Number 10	3.5
Number 11	3.6
Number 12	3.8
Number 13	3.6
Number 14	3.8
Number 15	3.3
Number 16	2.9
Number 17	3
Number 18	3.2
Number 19	3.3
Number 20	3.7
Number 21	3.3
Number 22	3.6
Number 21	4.2
Number 22	3.4
Number 23	3.7
Number 24	3.2
Number 25	3.6
Number 26	3.5
Number 27	3.5
Number 28	3.5

	Per cent.
Number 29	4.1
Number 30	3.8
Number 31	3.6
Number 32	3.4
Number 33	3.8
Number 34	3.8
Number 35	3.4
Number 36	3.3
Number 37	3.3
Number 38	3
Number 39	3.6
Number 40	3.2
Number 41	3.9
Number 42	4
Number 43	3.8
Number 44	3.9
Number 45	3.8
Number 46	3.6
Number 47	4
Number 48	3.4
Number 49	3.6
Number 50	4
Number 51	3.8
Number 52	4.4
Number 53	3

The factory experiments on July 5, were made at the factory of Mr. I. E. Finster, Lacona, Oswego county. Following is the test of the milk:

	Fat. Per ct.	Milk. Pounds.
Number 1	3.9	187
Number 2	3.4	525
Number 3	3.8	560
Number 4	3.8	245
Number 5	3.3	442
Number 6	3.6	518
Number 7	3.4	350
Number 8	3.6	431

		Fat. Per ct.	Milk. Pounds.
Number 9	.....	3.6	200
Number 10	.....	3.6	493
Number 11	.....	4.0	285
Number 12	.....	3.8	558
Number 14	.....	3.8	492
Number 15	.....	3.6	325
Number 16	.....	3.8	238
Number 17	.....	3.6	258
Number 18	.....	3.8	150
Number 19	.....	3.4	292
Number 20	.....	3.4	367
Number 21	.....	3.1	257
Number 22	.....	3.5	215
Number 23	.....	3.6	111
Number 24	.....	4.0	336
Number 25	.....	3.6	75
Number 26	.....	3.6	178
Number 27	.....	3.6	222
Number 28	.....	3.4	140
Number 29	.....	3.3	98
Number 30	.....	3.6	325
Number 31	.....	4.0	90

The following is a report of the test of the milk at Merry's factory, the first of September, for percentage of fat:

		Aug. 30.	Aug. 31.	Sept. 1.	Sept. 2.
Number 1	.....	4.0	3.4	3.4	.....
Number 2	.....	3.5	3.6	3.5	.....
Number 3	.....	3.6	3.5	3.6	3.5
Number 4	.....	4.2	3.5	4.2	.....
Number 5	.....	3.6	3.4	3.4	3.8
Number 6	.....	4.1	3.8	3.8	.....
Number 7	.....	3.6	3.5	3.4	3.8
Number 8	.....	4.0	3.9	3.9	.....
Number 9	.....	3.7	3.6	3.9	.....
Number 10	.....	4.2	4.0	3.9	.....
Number 11	.....	3.8	3.5	4.3	.....

	Aug. 30.	Aug. 31.	Sept. 1.	Sept. 2.
Number 12	4.0	3.7	3.7	.....
Number 13	3.8	4.2	3.6	4.0
Number 14	3.6	3.8	4.1	3.9
Number 15	4.0	3.8	4.0	.....
Number 16	3.4	3.4	3.4	3.8
Number 17	4.5	4.1	4.0	.....
Number 18	3.8	3.6	4.2	.....
Number 19	3.8	3.6	3.7	.....
Number 20	3.6	3.9	3.7	.....
Number 21	4.2	4.0	4.0	.....
Number 22	4.3	3.8	4.4	.....
Number 23	4.1	4.0	4.3	.....
Number 24	4.0	3.4	4.4	3.2
Number 25	4.0	3.4	3.9	.....
Number 26	4.1	4.0	4.5	.....
Number 27	3.8	3.6	3.7	.....
Number 28	3.9	3.7	3.9	.....
Number 29	3.9	3.6	3.5	3.6
Number 30	3.6	3.4	3.7	.....
Number 31	4.4	3.8	4.0	.....
Number 32	4.1	3.7	3.8	.....
Number 33	3.7	3.4	3.8	.....
Number 34	3.7	3.8	3.7	.....
Number 35	4.0	4.3	4.4	.....
Number 36	4.0	3.9	4.3	.....
Number 37	3.8	3.8	3.9	.....
Number 38	3.6	3.9	3.7	.....
Number 39	4.1	4.2	4.2	.....
Number 40	4.0	3.9	3.9	.....
Number 41	3.6	3.4	3.4	3.8
Number 42	4.1	3.5	3.7	.....
Number 43	3.6	3.8	4.0	.....
Number 44	3.8	3.6	4.2	.....
Number 45	3.6	3.5	3.4	3.8
Number 46	3.9	3.7	3.7	3.7
Number 47	3.5	3.3	3.6	.....
Number 48	4.0	3.6	3.8	.....

	Aug. 30.	Aug. 31.	Sept. 1.	Sept. 2.
Number 49	4.0	4.0	4.2	.....
Number 50	3.8	3.2	3.6	.....
Number 51	3.5	3.4	3.7	.....
Number 52	3.8	3.8	4.0	.....
Number 53	4.0	3.6	3.9	.....
Number 54	3.8	3.5	3.8	.....
Number 55	3.6	3.9	3.7	.....
Number 56	4.0	3.7	4.0	.....

INVESTIGATIONS RELATING TO THE MANUFACTURE OF CHEESE.*

Points to be Investigated.

As planned, the investigation will aim to throw all the light possible on the following points:

1. What changes in composition does the milk undergo during the factory season, and how do such changes affect its cheese-producing power in regard to both quantity and quality of yield?

2. What is the maximum loss of fat that can be regarded as unavoidable in the manufacture of cheese from normal milk containing different amounts of fat?

3. What influence has partial skimming of milk upon the quantity and quality of cheese yield?

4. Under the same conditions of manufacture, is there a definite relation between the amount of fat in the milk and the proportion in the corresponding cheese; and, if there is such a definite relation, what is it?

5. What is the cheese-making power or efficiency of fat in milk for normal milk containing different amounts of fat; that is, what is the relation of fat in milk to yield of cheese? For example,

* These investigations and experiments were carried on in co-operation with the New York Agricultural Experiment Station, at Geneva, N. Y. The detailed planning of the work, the chemical analyses and the preparation of the bulletins were performed by the station chemist, or under his immediate direction and supervision. The operation of manufacturing cheese was done by the cheese-making experts of this department. The factory experiments were made as follows: In May at the factory of Mr. G. Merry, Verona, Oneida county; in June at the factory of W. C. Stone, Mannsville, Jefferson county; in July at the factory of I. E. Finster, Lacona, Oswego county; in August at the factory of E. A. Ayers, Rices', Jefferson county. The cheese-making in May and July was done by Mr. Geo. A. Smith; in June by Mr. W. W. Hall, and in August by Messrs. Geo. A. Smith and M. T. Morgan.

how much cheese should be made from normal milk containing three per cent of fat; from milk containing three and one-half per cent of fat, etc.?

6. Under what conditions and to what extent is caseine lost in cheese-making?

7. How much albumen is present in milk; under what conditions and to what extent is it lost in cheese-making? Is it possible to prevent such loss in part or in whole?

8. What relation, if any, exists between the amount of caseine and albumen in milk and the proportion of caseine and albumen in the corresponding cheese?

9. What is the relation of caseine and albumen in milk to yield of cheese?

10. Is it possible to establish such definite relations between the composition of milk and the composition of the corresponding cheese that from knowing the composition of one we can tell the composition of the other with a fair degree of accuracy?

11. How does the stirred-curd process compare with the Cheddar process of cheese manufacture in regard to (a) the loss of fat and the other constituents of milk; (b) the composition of cheese; (c) the yield of cheese, and (d) the general quality of the cheese?

12. How does the use of ordinary amounts of rennet compare with the use of smaller and larger amounts of rennet in regard to the loss of milk constituents, and in regard to the composition, yield and ripening of cheese?

13. How does the cutting of curd in a soft or hard condition affect the loss of milk constituents, the composition, yield and quality of cheese?

14. How does the use of high temperature in the manufacture of cheese affect the loss of milk-constituents, the composition, yield and quality of the cheese?

15. What changes occur in the ripening process; (a) in the composition of the fat; (b) in the composition of the caseine and albumen, and (c) in the sugar? The study of the ripening process will be deferred to the close of the summer, when cheeses will be made under special conditions for the purpose of studying the ripening process.

It is hoped that it may be found practicable to issue a bulletin on the work of each month during the season, and, at the end, present, in a special bulletin, a summary of the whole season's work.

CHEESE INVESTIGATION AND EXPERIMENTS FOR MAY.

In addition to other points already noted as subjects of investigation, it was hoped that, in the factory work for May, we might learn why so much more milk is required to make a pound of cheese than at any other time during the season. This fact has been very generally noticed by factories in this State. Is it due to feed or to the stage of lactation? An apparently satisfactory answer has been found, which will be presented and discussed later.

Character of Milk Used.

The milk used in making the cheese was, in every case, mixed milk from morning and previous evening. The factory milk was, in every case, whole milk. In many of the factory experiments the milk was tested and divided, the richer milks being run into one vat, and the poorer milks into another vat. The cows were mainly in the early stage of the lactation period.

The milk used in the station experiments came from various breeds of cattle, Jerseys predominating; the animals varying greatly as regards the stage of lactation period. The milk was whole milk in all the experiments except those numbered seven and eight; in these experiments the milk that had stood over night in tall cans, was divided, the upper portion being poured into one vat and the lower portion into another vat. The character of the factory milk was so different from that of the station milk that, in the discussion of the results later, we shall consider the two sets of experiments more or less separately.

In some of our future station experiments, we shall compare the results of making cheese from whole milk and the same kind of milk partially skimmed by centrifugal machine.

Methods of Analysis, Sampling, etc.

In determining the fat in the milk, whey and cheese, gravimetric methods were exclusively employed. Only one analysis was made of the whey. Our data last year showed that, in most cases, the

constituents of what we called the second and third wheys were very small in quantity and could be left out of consideration.

The green cheese alone has been analyzed thus far. For purposes of comparison, the green cheese furnishes the best basis for the reason that it is easier to get a representative sample for analysis from a green cheese than from one that has become uneven in composition as a result of partial and variable loss of moisture. In sampling the green cheese, three cylinders are drawn, one from near the margin of the cheese, one at the center and one half way between the other two.

The amount of whey used in the tables is calculated by subtracting from the milk used the weight of green cheese. The results indicate that there can be but little error in this method.

In the tables, which give the analyses, the results are all made comparable by calculating the constituents for 100 pounds of milk.

Method Employed as a Basis for Making Calculations.

The amounts of constituents lost and recovered in the various experiments are based upon the analyses of the milk and whey and are calculated for 100 pounds of milk in every case.

The amounts of constituents found in the whey added to the amounts found in the green cheese should just equal the amounts in the milk. There would be absolute agreement, if it were possible to avoid all sources of error, but slight errors in analysis, sampling, etc., are unavoidable. In comparison, it will be found that the agreements are, as a rule, quite as close as could be expected.

Throughout this bulletin the factory experiments are numbered from one to six; and the station experiments from seven to fourteen.

In the tables of analytical data immediately following, the experiments are arranged in chronological order, but in the discussion of results following later, the experiments are arranged with reference to the amount of fat contained in the milk, commencing with the lowest.

Analyses of Milk, Whey and Cheese.—COMPOSITION EXPRESSED IN PARTS PER HUNDRED.

	Per cent of water.	Per cent of total solids.	Per cent of fat.	Per cent of caseine and albumen	Per cent of caseine.	Per cent of albumen.	Per cent of sugar, ash, etc.
No. 1—May 4:							
Milk	88.53	11.47	3.05	2.60	1.98	0.62	5.82
Whey	93.39	6.61	0.26	0.67	0.13	0.54	5.68
Green cheese.....	37.35	62.65	33.13	23.88	22.36	1.52	5.64
No. 2—May 4:							
Milk	88.36	11.64	3.37	2.53	1.93	0.60	5.76
Whey	93.15	6.85	0.33	0.68	0.13	0.55	5.84
Green cheese.....	36.47	63.53	35.64	23.31	21.66	1.65	4.58
No. 3—May 5:							
Milk	88.26	11.74	3.04	2.67	1.98	0.69	6.03
Whey	92.87	7.13	0.30	0.70	0.13	0.57	6.13
Green cheese.....	37.29	62.71	33.70	24.10	23.24	0.86	4.91
No. 4—May 5:							
Milk	87.97	12.03	3.28	2.63	2.03	0.60	6.12
Whey.....	92.83	7.17	0.36	0.71	0.17	0.54	6.10
Green cheese.....	37.00	63.00	34.80	23.18	22.29	0.89	5.02
No. 5—May 6:							
Milk	87.81	12.19	3.10	2.72	2.06	0.66	6.37
Whey	92.60	7.40	0.33	0.71	0.16	0.55	6.36
Green cheese.....	37.92	62.08	32.44	23.69	22.04	1.65	5.95

Analyses of Milk, Whey and Cheese.—COMPOSITION EXPRESSED IN PARTS PER HUNDRED—(Concluded).

	Per cent of water.	Per cent of total solids.	Per cent of fat.	Per cent of caseine and albumen.	Per cent of caseine.	Per cent of albumen.	Per cent of sugar, ash, etc.
No. 12 — May 26:							
Milk	86.22	13.77	4.20	3.41	2.60	0.81	6.17
Whey	92.54	7.46	0.36	0.90	0.19	0.71	6.20
Green cheese.....	33.53	66.47	36.18	24.19	22.50	1.69	6.10
No. 13 — May 27:							
Milk	86.49	13.51	4.28	3.50	2.68	0.82	5.73
Whey	92.68	7.32	0.29	0.92	0.15	0.77	6.11
Green cheese.....	35.00	65.00	36.12	23.43	22.80	0.63	5.45
No. 14 — May 27:							
Milk	86.49	13.51	4.28	3.50	2.68	0.82	5.73
Whey	92.64	7.36	0.28	0.91	0.16	0.75	6.17
Green cheese.....	34.25	65.75	37.10	23.75	22.80	0.95	4.90

Analyses of Milk, Whey and Cheese.—FROM ONE HUNDRED POUNDS OF MILK.

	Pounds.	Pounds of water.	Pounds of total solids.	Pounds of fat	Pounds of caseine and albumen.	Pounds of caseine	Pounds of albumen.	Pounds of sugar, ash, etc.
No. 1—May 4:								
Milk	100	88.53	11.47	3.05	2.60	1.98	0.62	5.82
Whey	91.46	85.41	6.05	0.24	0.61	0.12	0.49	5.20
Cheese	8.54	3.19	5.35	2.83	2.04	1.91	0.13	0.48
No. 2—May 4:								
Milk	100	88.36	11.64	3.37	2.53	1.93	0.60	5.76
Whey	91.25	85.00	6.25	0.30	0.62	0.12	0.50	5.33
Cheese	8.75	3.19	5.56	3.12	2.04	1.90	0.14	0.40
No. 3—May 5:								
Milk	100	88.26	11.74	3.04	2.67	1.98	0.69	6.03
Whey	91.53	85.00	6.53	0.27	0.64	0.12	0.52	5.62
Cheese	8.47	3.16	5.31	2.85	2.04	1.96	0.08	0.42
No. 4—May 5:								
Milk	100	87.97	12.03	3.28	2.63	2.03	0.60	6.12
Whey	90.95	84.43	6.52	0.33	0.64	0.15	0.49	5.55
Cheese	9.05	3.35	5.70	3.15	2.10	2.01	0.09	0.45
No. 5—May 6:								
Milk	100	87.81	12.19	3.10	2.72	2.06	0.66	6.37
Whey	91.38	84.62	6.76	0.30	0.65	0.15	0.50	5.81
Cheese	8.62	3.27	5.35	2.80	2.04	1.90	0.14	0.51

Analyses of Milk, Whey and Cheese.—FROM ONE HUNDRED POUNDS OF MILK—(Concluded)

	Pounds.	Pounds of water.	Pounds of total solids.	Pounds of fat.	Pounds of caseine and albumen.	Pounds of caseine.	Pounds of albumen.	Pounds of sugar, ash, etc.
No. 6—May 6:								
Milk	100	87.52	12.48	3.37	2.78	2.01	0.77	6.33
Whey	90.87	84.04	6.83	0.31	0.68	0.14	0.54	5.84
Cheese	9.13	3.34	5.79	3.13	2.13	1.99	0.14	0.53
No. 7*—May 24:								
Milk	100	86.47	13.53	3.56	3.46	2.69	0.77	6.51
Whey	89.80	83.28	6.52	0.21	0.84	0.16	0.68	5.47
Cheese	10.20	3.72	6.48	3.24	2.66	2.53	0.12	0.58
No. 8*—May 24:								
Milk	100	84.24	15.76	6.00	3.4	2.73	0.73	6.30
Whey	86.70	80.42	6.28	0.34	0.80	0.17	0.63	5.14
Cheese	13.30	4.48	8.82	5.58	2.68	2.52	0.16	0.56
No. 9—May 25:								
Milk	100	86.10	13.90	4.20	3.35	2.63	0.72	6.35
Whey	89.00	82.28	6.72	0.27	0.78	0.16	0.62	5.67
Cheese	11.00	3.91	7.09	3.97	2.60	2.52	0.08	0.52
No. 10—May 25:								
Milk	100	86.09	13.91	4.38	3.50	2.72	0.78	6.03
Whey	88.90	82.35	6.55	0.35	0.84	0.15	0.69	5.36
Cheese	11.10	3.92	7.18	4.06	2.68	2.57	0.11	0.44

No. 11 — May 26:									
Milk	100	86.35	13.65	4.15	3.40	2.72	0.68	6.10	
Whey	88.75	82.24	6.51	0.31	0.80	0.18	0.62	5.40	
Cheese	11.25	3.85	7.40	4.04	2.66	2.54	0.12	0.70	
No. 12 — May 26:									
Milk	100	86.22	13.78	4.20	3.41	2.60	0.81	6.17	
Whey	89.00	82.36	6.61	0.32	0.80	0.17	0.63	5.52	
Cheese	11.00	3.69	7.31	3.98	2.66	2.48	0.18	0.67	
No. 13 — May 27:									
Milk	100	86.49	13.51	4.28	3.50	2.68	0.82	5.73	
Whey	88.45	81.98	6.47	0.26	0.81	0.13	0.68	5.40	
Cheese	11.55	4.04	7.51	4.17	2.71	2.63	0.08	0.63	
No. 14 — May 27:									
Milk	100	86.49	13.51	4.28	3.50	2.68	0.82	5.73	
Whey	88.75	82.22	6.53	0.25	0.81	0.14	0.67	5.47	
Cheese	11.25	3.85	7.40	4.17	2.67	2.57	0.10	0.56	

*** Milk was not normal.**

TABULATED STATEMENT OF THE PRINCIPAL CONDITIONS OF MANUFACTURE.

No. of experiment.	DATE.	Kind of cheese made.	Pounds of milk used.	Pounds of green made.	Temperature of milk when rennet was added.	Ounces of rennet extract used per 1,000 lbs. of milk.	Time required for milk to begin to thicken.	Time from adding rennet to cutting curd.	Condition of curd when cut.	Temperature to which curd was heated after cutting, etc.	Time taken to heat to 98 or more.	Time from reaching required temperature to drawing whey.	Time from drawing whey to salting.	Ounces of salt used for each pound of fat in milk.	Time from salting to putting in press.	H. M.	Whole time of operation.
1..	1892. May 4th.....	Cheddar..	3,583	306.	Deg. 82	4.	Min. 14	Min. 19	Ordinary.....	Deg. 98	Min. 60	Min. 135	Min. 50	1.05	Min. 10	5 25	
2..	May 4th.....	Cheddar..	3,873	295.	84	4.	13	20	Ordinary.....	98	63	69	70	0.95	10	5 05	
3..	May 5th.	Cheddar..	3,447	292.	84	4.	16	26	Ordinary.....	98	63	194	103	1.05	10	8 04	
4..	May 5th.....	Cheddar..	3,326	301.	84	4.	15	25	Soft	98	74	160	110	0.98	10	8 34	
5..	May 6th.....	Cheddar..	3,537	305.	85	4.	15	21	Ordinary.....	98	75	122	59	1.03	10	7 ..	
6..	May 6th.....	Cheddar..	3,307	302.	84	4.	16	25	Ordinary.....	98	85	150	108	0.95	10	8 40	
7..	May 24th.....	Cheddar..	250	25.47	84	3.	11	16	Ordinary.....	99	31	60	140	0.89	25	6 ..	
8..	May 24th.....	Cheddar..	250	33.18	84	3.	11	16	Ordinary.....	99	31	80	310	0.80	25	6 05	
9..	May 25th.....	Strd curd.	275	30.31	84	3.6	9	19	Ordinary.....	98	35	105	95	1.14	55	6 20	
10..	May 25th.....	Cheddar..	275	30.63	84	1.8	14	32	Ordinary.....	98	35	85	135	1.00	30	8 05	
11..	May 26th.....	Cheddar..	800	33.78	84	4.	10	20	Ordinary.....	99	43	82	175	1.06	15	7 ..	
12..	May 26th.....	Cheddar..	800	33.09	84	8.	7	13	Ordinary.....	99	43	72	175	1.05	15	6 50	
13..	May 27th.....	Cheddar..	275	31.75	82	2.5	16	25	Soft	99	30	90	175	1.03	10	6 30	
14..	May 27th.....	Cheddar..	275	31.00	82	2.5	16	30	Hard	99	30	80	175	1.03	15	6 25	

Hansen's rennet extract was used in all the station experiments.

Statement of Results.

An examination of the foregoing table indicates, among other interesting results, the following:

1. Time required for milk to begin to thicken after addition of rennet:

a. Factory experiments.—The time was fairly uniform, the same amount of rennet being used, varying from thirteen to sixteen minutes, and averaging about fifteen minutes.

b. Station experiments.—Varying amounts of rennet were used. The beginning of coagulation took place in from seven to sixteen minutes, with an average of about twelve minutes. The general tendency was to more rapid action with an increased amount of rennet.

2. Time adding rennet to cutting curd:

a. Factory experiments.—The time varied from nineteen to twenty-six minutes, and averaged twenty-two and a half minutes.

b. Station experiments.—The variation in time was from thirteen to thirty minutes, with an average time of about twenty-one minutes.

3. Time required to heat to 98 F. after cutting and stirring:

a. Factory experiments.—The time varied from sixty to eighty-five minutes, averaging seventy minutes.

b. Station experiments.—The variation of time was from thirty to forty-three minutes, with an average time of thirty-five minutes.

4. Time from reaching 98 F. to drawing whey:

a. Factory experiments.—The time varied from sixty-nine to 194 minutes, with an average of 138 minutes.

b. Station experiments.—The variation of time was from sixty to 105 minutes, with an average time of eighty-one minutes.

This portion of the operation appears to be less under control than the other portions, the variation being much greater at the factory than at the station.

5. Time from drawing whey to salting curd:

a. Factory experiments.—The time varied from fifty to 110 minutes, and averaged eighty-three minutes.

b. Station experiments.—The time varied from ninety-five to 175 minutes, and averaged 148 minutes.

6. Time occupied by whole operation of cheese-making:

a. **Factory experiments.**—The time varied from five to over eight hours, and averaged a little over seven hours.

b. **Station experiments.**—The time varied from six to seven hours, and averaged nearly six and one-half hours.

It appears that, for the most part, the station experiments were under better control than those at the factory. This is probably due to the fact that the condition of the milk was under better control before it was brought into the cheese-vat, and also the amount of milk used was small.

LOSS OF MILK-CONSTITUENTS IN CHEESE-MAKING.

Under this head, the following points will be discussed:

1. Amount of fat recovered and lost in cheese-making.
2. Amount of caseine and albumen, taken together, recovered and lost in cheese-making.
3. Amount of caseine recovered and lost in cheese-making.
4. Amount of albumen recovered and lost in cheese-making.
5. Relation of albumen to caseine in milk.
6. Influence of relation of fat to caseine and albumen on loss of these compounds in cheese-making.

Amount of Fat Recovered and Lost in Cheese-making.

In comparing the losses of fat and other milk constituents, the experiments are arranged with reference to the amount of fat in the milk, commencing with the lowest. This order will be followed throughout the remainder of this bulletin.

In the table below are presented the data arranged so as to show, first, the actual amounts of fat recovered and lost in the various experiments for 100 pounds of milk used; and, second, the proportion of per cent of fat in the milk that was recovered and lost. Thus, in the first experiment in the table below, 100 pounds of milk contain 3.04 pounds of fat; of this amount, 0.27 pounds of fat or 8.88 per cent of 3.04, the amount of fat in the milk, were lost in the whey; while the balance, 2.77 pounds, or 91.12 per cent of the fat in the milk, was recovered in the cheese.

TABLE SHOWING AMOUNT OF FAT RECOVERED AND LOST IN
CHEESE-MAKING.

Number of experi- ment.	Pounds of fat in 100 pounds of milk.	Pounds of fat in 100 pounds of milk lost.	Pounds of fat re- covered from 100 pounds of milk.	Per cent of fat in milk lost in whey.	Per cent of fat in milk recov- ered in cheese.
3....	3.04	0.27	2.77	8.88	91.12
1....	3.05	0.24	2.81	7.87	92.13
5....	3.10	0.30	2.80	9.68	90.32
4....	3.28	0.33	2.95	10.00	90.00
2....	3.37	0.30	3.07	8.90	91.10
6....	3.37	0.31	3.06	9.20	90.80
7....	3.56	0.21	3.35	5.90	94.10
11....	4.15	0.31	3.84	7.47	92.53
9....	4.20	0.27	3.93	6.43	93.57
12....	4.20	0.32	3.88	7.62	93.38
13....	4.28	0.26	4.02	6.07	93.93
14....	4.28	0.25	4.03	5.84	94.16
10....	4.38	0.35	4.03	8.00	92.00
8....	6.00	0.34	5.66	5.67	94.33

Statement of Results.

1. Pounds of fat in 100 pounds of milk:

a. Factory experiments.—The milk varied from 3.04 to 3.37 pounds in 100 pounds of milk, and averaged 3.20 pounds.

b. Station experiments.—The milk-fat varied from 3.56 to 6.00 pounds of fat in 100 pounds of milk, and averaged 4.38 pounds; or, if we exclude the lowest and highest numbers, which do not represent normal milks, the variation of fat was from 4.15 to 4.38 pounds in the six station milks that were normal, the average of fat being 4.25 pounds.

2. Pounds of fat lost for 100 pounds of milk:

a. Factory experiments.—The amount of fat lost in the whey varied from 0.24 to 0.33 pounds for each hundred pounds of milk and averaged 0.29 pounds.

b. Station experiments.—In the eight experiments, the loss of fat varied from 0.21 to 0.35 pounds for each hundred pounds of milk and averaged 0.29 pounds; or, taking the six normal milks, the loss of fat varied from 0.25 to 0.35 pounds, with an average of 0.29 pounds.

If we examine the different experiments, we notice that the actual amount of fat lost tends to increase when the amount of fat in the milk increases. This tendency might appear more marked, if the conditions of the experiments had been entirely uniform. The reasons for some of the extreme variations we shall notice later. If we take the averages of the two sets of experiments, we see that while the fat in the station milks averaged over a pound more of fat for each hundred pounds of milk than did the factory milks, standing as 4.38 to 3.20 pounds, still the actual loss of fat for 100 pounds of milk was the same, being 0.29 pounds. These results do not fully confirm those secured in our experiments of last year, when the tendency appeared very marked to increased loss of fat with increased amounts of fat in the milk.

3. Per cent of fat in milk lost in whey:

a. Factory experiments.—The per cent of the milk-fat that was lost varied from 7.87 to 10 per cent, and averaged 9.06 per cent of the fat in the milk.

b. Station experiments.—The per cent of the fat lost varied from 5.67 to 8 per cent of the fat in the milk, and averaged 6.62 per cent of the fat in the milk.

If we compare the average loss of fat in the factory experiments 3, 1 and 5 with the average loss in 4, 2 and 6, we notice that in the latter case the loss is somewhat greater, the fat in the milk being greater also. If, however, we compare the factory and station experiments, we notice that the proportion of fat lost is considerably less in the latter, being as 8.81 to 6.62, though the station milk contains more fat. In examining the individual station experiments we see that the proportion of milk-fat lost does not appear to be, in any way, related to the amount of fat in the milk, since, in the milk containing 6 per cent of fat, the smallest proportion of fat, 5.67 per cent of the milk-fat, was lost.

As regards the greater proportionate loss of fat in the factory experiments, we cannot attribute it to less skill on the part of the maker, since the same maker was in charge of all the experiments. The difference is probably to be accounted for by the difference in the quality of the milk. We shall see later that the

station milk and factory milk differed in composition very markedly, and it is not too much to assume that the station milk was much more carefully handled before it came into the cheese-vat, and that it came from better animals, receiving better food and care.

4. Comparison of stirred-curd and Cheddar processes with reference to loss of fat:

a. In experiment No. 9 the stirred-curd process was employed, while in No. 10, made the same day, the Cheddar process was used. But, by mistake, the maker put into No. 10 only one-half the amount of rennet that was intended, and therefore it is impossible to make use of these two experiments for the purpose of comparing the two processes.

5. Influence of cutting curd in a soft or hard condition upon loss of fat:

a. In experiment 5, the curd was cut when it was in the state of hardness, at which the cheesemaker usually cuts it; in experiment 4 the curd was cut just before reaching the usual stage of hardness. The other conditions were kept as uniform as possible. In the soft-cut curd the loss of fat was 10 per cent of the fat in the milk; in the other, the loss was 9.68 per cent of the fat in the milk.

b. In experiment No. 13, the curd was cut in a soft condition, while in No. 14 it was allowed to become considerably harder than usual before cutting. The soft-cut curd showed a little more loss of fat than the hard-cut, the loss being as 6.07 to 5.84 per cent of the fat in the milk.

6. Influence of using different amounts of rennet upon loss of fat:

In experiment No. 10, 1.8 ounces of rennet were used, an amount considerably less than in any other case. It is noticeable that the amount of fat lost in this experiment was greater than in any of the other station experiments.

In experiment No. 10, 1.8 ounces of rennet were used, an amount No. 12, eight ounces. The difference of loss of fat in these two cases is very slight.

General Summary.

If we group together the different experiments in which milks of similar composition were used, and average the results obtained in this way, we can make the following table:

NUMBER OF EXPERIMENTS.	Pounds of fat in 100 lbs. of milk.	Pounds of fat lost in 100 lbs. of milk.	Pounds of fat recovered from 100 lbs. of milk.	Per cent of fat in milk lost in whey.	Per cent of fat in milk recovered in cheese.
3, 1, 5.....	3.06	0.27	2.79	8.81	91.19
4, 2, 6.....	3.34	0.31	3.03	9.28	90.72
9, 11, 12.....	4.20	0.30	3.90	7.15	92.85
10, 13, 14.....	4.30	0.29	4.01	6.74	93.26
7*	3.56	0.21	3.35	5.90	94.10
8*	6.00	0.34	5.66	5.67	94.33

The average amount of fat in 100 pounds of the various milks used for the May experiments was 3.38 pounds; the amount of fat lost in the whey was 0.29 pounds for each hundred pounds of milk, while 3.59 pounds of fat were recovered in the cheese; the per cent of fat lost averaged 7.48 per cent of the fat in the milk, which is very close to the average of last year's experiments. For the most part, the amount of fat lost in the whey did not appear to follow the variations of the fat in the milk. The extreme difference in loss of fat between the highest and lowest amounts was two and one-quarter ounces of fat for each hundred pounds of milk. The effect of cutting curd in a soft condition was somewhat to increase the loss of fat in whey. The use of rennet above the usual amount made little difference in loss of fat; but use of an insufficient amount of rennet resulted in noticeable loss.

Amount of Caseine and Albumen, Taken Together, Recovered and Lost in Cheese-making.

The caseine of milk is coagulated by rennet, while the albumen is not. In cheese-making, a small amount of caseine is lost in the whey, while a small amount of albumen is retained in the cheese mechanically in the same way that water is retained.

* Milk was not normal.

So, in the cheese, we have most of the caseine and a small portion of the albumen, while, in the whey, we have most of the albumen and a minute amount of caseine. Whenever we use the word caseine, in connection with our cheese experiments, we mean the caseine proper, as distinguished from the albumen. We will first consider the losses of these compounds together and then the losses of each separately.

TABLE SHOWING AMOUNT OF CASEINE AND ALBUMEN, TAKEN TOGETHER, RECOVERED AND LOST IN CHEESE-MAKING.

NUMBER OF EXPERIMENT.	Pounds of caseine and albumen in 100 lbs. of milk.	Pounds of caseine and albumen lost in 100 lbs. of milk	Pounds of caseine and albumen recovered in 100 lbs. of milk.	Per cent of caseine and albumen in milk lost in whey.	Per cent of caseine and albumen in milk recovered in cheese.
3	2.67	0.64	2.03	23.97	76.03
1	2.60	0.61	1.99	23.46	76.54
5	2.72	0.65	2.07	23.90	76.10
4	2.63	0.64	1.99	24.33	75.67
2	2.53	0.62	1.90	24.50	75.50
6	2.78	0.68	2.10	24.56	75.54
7	3.46	0.84	2.65	24.28	75.72
11	3.40	0.80	2.60	23.53	76.47
9	3.35	0.70	2.57	23.28	76.72
12	3.41	0.81	2.69	23.46	76.54
13	3.50	0.81	2.69	23.14	76.86
14	3.50	0.81	2.69	23.14	76.86
10	3.50	0.84	2.66	24.00	76.00
8	3.46	0.80	2.66	23.12	76.18

Statement of Results.

1. Pounds of caseine and albumen in 100 pounds of milk:

a. Factory experiments.—The amount of caseine and albumen in the milk varied from 2.53 to 2.78 pounds in 100 pounds of milk, and averaged 2.65 pounds.

b. Station experiments. The amount of caseine and albumen in the milk varied from 3.35 to 3.50 pounds in 100 pounds of milk, and averaged 3.45 pounds.

2. Pounds of caseine and albumen lost for 100 pounds of milk:

a. Factory experiments.—The amount of caseine and albumen lost in the whey varied from 0.61 to 0.68 pounds for each hundred

pounds of milk and averaged 0.64 pounds, an extreme difference of 0.07 pounds.

b. Station experiments.—The amount of caseine and albumen lost in the whey varied from 0.78 pounds to 0.84 pounds, and averaged 0.81 pounds for 100 pounds of milk, an extreme difference of 0.06 pounds.

3. Per cent of caseine and albumen in milk lost in whey:

a. Factory experiments.—The per cent of caseine and albumen that was lost varied from 23.46 to 24.50 per cent of the caseine and albumen in the milk, and averaged 24.10.

b. Station experiments.—The per cent of caseine and albumen lost varied from 23.12 to 24.28 per cent of the caseine and albumen in the milk, with an average of 23.50 per cent.

It will be noticed that the actual loss of caseine and albumen in 100 pounds of milk is nearly .2 of a pound more in the station experiments, the losses averaging 0.64 and 0.81 pounds; but when we come to compare the per cent or proportion of the caseine and albumen in the milk that was lost in the whey, we see that the proportion of loss was somewhat less in case of the station experiments, being 23.50 against 24.10. That is, the milk which contained the smaller amounts of caseine and albumen lost relatively larger amounts in the whey. The reason for this will appear later.

4. Influence of cutting curd soft and hard upon loss of caseine and albumen:

In experiment 4, where the curd was cut quite soft, the loss was somewhat greater than in No. 5, when the curd was cut in its ordinary degree of hardness. In experiments 13 and 14, when one was cut very soft and one very hard, there was no difference in loss.

5. Influence of using different amounts of rennet upon loss of caseine and albumen:

In experiment 10, where a very small amount of rennet was used, the loss of caseine and albumen was noticeably greater than in most other station experiments. In 11 and 12 when four and eight ounces of rennet were used, there was practically no difference in results.

6. General summary:

Taking the fourteen May experiments, the amount of caseine and albumen in 100 pounds of milk averaged 3.10 pounds; the average amount of caseine and albumen lost in the whey was 0.74 pounds for each hundred pounds of milk, while 2.36 pounds were recovered in the cheese; the per cent of caseine and albumen lost averaged about 23.8 per cent of the caseine and albumen present in the milk. As a rule, the amount of caseine and albumen lost appeared to increase or decrease quite uniformly as the amount of caseine and albumen in the milk increased or decreased; hence the proportion of loss was quite uniform.

Amount of Caseine Recovered and Lost in Cheese-making.

We have seen in the foregoing pages the extent of loss of caseine and albumen in cheese-making; but it is desirable to know, in addition, how much caseine is lost and recovered, apart from the albumen. The loss of caseine is, in part, due to the passage of very fine particles of caseine through the strainer when the whey is drawn off. These minute particles can readily be seen by letting a pail of freshly-drawn whey stand awhile until the caseine settles, and then pouring off the whey, when a noticeable quantity of finely-divided caseine can be seen at the bottom of the pail. This loss is made greater by carelessness or violence in cutting the curd and in subsequent handling, by agitation while drawing off the whey and by imperfect strainers. To what extent loss of caseine may be due to insufficient use of rennet, we cannot say, but it is probable that in all factory work an abundance of rennet is always used to prevent loss of caseine from this cause.

In addition to the caseine lost mechanically, a small amount is lost on account of its soluble condition. When caseine is acted upon by rennet, it is converted into two different compounds; one of these, constituting the greater portion, is insoluble and forms the solid portion of the curd proper, while the other, which is usually small in quantity, is soluble and passes into the whey along with the albumen, which it resembles in several respects.

There are, therefore, two normal or inevitable sources of loss of caseine: First, mechanical, in which the very finely divided particles of solid caseine escape through the strainer; and, second, a chemical source of loss, in which a portion of the caseine is con-

verted probably by the action of rennet, into a soluble form resembling albumen somewhat. The loss of insoluble caseine from the first source can be more or less kept under control; but the loss of soluble caseine is unavoidable, so far as we know.

There is still another source of loss which is probably avoidable, and which we may call abnormal. There are certain bacteria that have the power of converting the coagulated caseine or curd into a soluble form, or of preventing the coagulating action of the rennet. When curd or milk is acted upon by such bacteria and rendered soluble, not only is the caseine thus dissolved lost in the whey, but, in addition, there must be lost all of the fat that was inclosed in the curd. This action of such bacteria doubtless explains the noticeable loss that has been generally observed in making cheese from tainted milk. Extreme care in regard to the food and drink of animals, and strict cleanliness in respect to the barn, animals, milking and all vessels and utensils with which the milk comes in contact, will remedy this source of loss. As is well known, a hundred pounds or less of badly tainted milk will reduce the yield of several thousand pounds of good milk with which it is mixed.

In the table below, the "caseine lost" includes both the insoluble and the soluble caseine that passed into the whey. The insoluble caseine was determined directly, while the soluble portion was estimated indirectly and the amount then added to the insoluble.

TABLE SHOWING AMOUNT OF CASEINE RECOVERED AND LOST IN MAKING CHEESE.

NUMBER OF EXPERIMENT.	Pounds of caseine in 100 lbs. of milk.	Pounds of caseine lost in whey for 100 lbs. of milk.	Pounds of caseine recovered in cheese for 100 lbs. of milk.	Per cent of caseine in milk lost in whey.	Per cent of caseine in milk recovered in cheese.
3.....	1.98	0.12	1.86	6.1	93.9
1.....	1.78	0.12	1.86	6.1	93.9
5.....	2.06	0.15	1.91	7.3	92.7
4.....	2.03	0.15	1.88	7.4	92.6
2.....	1.93	0.12	1.81	6.2	93.8
6.....	2.01	0.14	1.87	7.0	93.0
7.....	2.69	0.16	2.53	6.0	94.0
11.....	2.72	0.18	2.54	6.6	93.4
9.....	2.63	0.17	2.47	6.1	93.9
12.....	2.60	0.17	2.43	6.5	93.5
13.....	2.68	0.13	2.55	5.0	95.0
14.....	2.68	0.14	2.54	5.2	94.8
10.....	2.72	0.15	2.57	5.5	94.5
8.....	2.73	0.17	2.56	6.2	93.8

Statement of Results.

1. Pounds of caseine in 100 pounds of milk:

a. Factory experiments.—The amount of caseine in the milk varied from 1.93 to 2.06 pounds in 100 pounds of milk, averaging about two pounds. It was, therefore, quite constant in quantity.

b. Station experiments.—The caseine varied from 2.60 to 2.73 pounds in 100 pounds of milk, and averaged 2.68 pounds, being quite constant in amount, but considerably greater than in the factory milk.

2. Pounds of caseine lost for 100 pounds of milk:

a. Factory experiments.—The amount of caseine lost in the whey for 100 pounds of milk varied from 0.12 to 0.15 pounds, and averaged about 0.13 pounds.

b. Station experiments.—The loss of caseine varied from 0.13 to 0.18 pounds in 100 pounds of milk, and averaged 0.16 pounds.

3. Per cent of caseine in milk lost in whey:

a. Factory experiments.—Of the caseine in the milk, from 6.1 to 7.4 per cent was lost in the whey, with an average of about 6.5 per cent, 93.5 per cent of the caseine being recovered in the cheese.

b. Station experiments.—From 5 to 6.6 per cent of the caseine in the milk was lost in the whey, with an average loss of 6 per cent, 94 per cent being recovered in the cheese.

4. Amount of soluble and insoluble caseine lost in whey:

a. Factory experiments.—The amount of insoluble caseine lost in the whey averaged about .06 pounds and the soluble caseine .07 pounds.

b. Station experiments.—The insoluble caseine lost in the whey averaged about .07 pounds and the soluble caseine .09 pounds.

General Summary.

In all the experiments, the average amount of caseine in 100 pounds of milk was 2.40 pounds, of which 0.15 pounds were lost in the whey and 2.25 pounds recovered in the cheese. On an average, 6.2 per cent of the caseine in the milk was lost, while 93.8 per cent was recovered in the cheese. While the amount of caseine lost was small, and was quite uniform, it appears that

in those milks which contained the larger amounts of caseine the loss was slightly larger. The amount of soluble caseine lost in the whey was a trifle greater than the amount of insoluble caseine lost.

Amount of Albumen Recovered and Lost in Cheese-making.

Albumen in milk can be coagulated by heat and by various chemical reagents, but not by action of rennet. The degree of heat used in making cheese is insufficient to coagulate the albumen, and most of it passes into the whey. A variable quantity is retained mechanically in the cheese.

TABLE SHOWING AMOUNT OF ALBUMEN RECOVERED AND LOST IN CHEESE-MAKING.

NUMBER OF EXPERIMENT.	Pounds of albumen in 100 lbs. of milk.	Pounds of albumen lost in whey for 100 lbs. of milk.	Pounds of albumen recovered in cheese for 100 lbs. of milk.	Per cent of albumen in milk lost in whey.	Per cent of albumen in milk recovered in cheese.
3.....	0.69	0.53	0.17	75.4	24.6
1.....	0.62	0.49	0.13	79.0	21.0
5.....	0.66	0.50	0.16	75.8	24.2
4.....	0.60	0.49	0.11	81.7	18.3
2.....	0.60	0.50	0.10	83.3	16.7
6.....	0.77	0.54	0.23	70.1	29.9
7.....	0.77	0.68	0.09	88.3	11.7
11.....	0.68	0.62	0.06	91.2	8.8
9.....	0.72	0.62	0.10	86.1	13.9
12.....	0.81	0.63	0.18	77.8	22.2
13.....	0.82	0.68	0.14	83.0	17.0
14.....	0.82	0.67	0.15	81.7	18.3
10.....	0.78	0.69	0.09	88.5	11.5
8.....	0.73	0.63	0.10	86.3	13.7

Statement of Results.

1. Pounds of albumen in 100 pounds of milk.
- a. Factory experiments.—The amount of albumen in the milk varied from 0.60 to 0.77 pounds in 100 pounds of milk, with an average of 0.66 pounds.

b. Station experiments.—The albumen varied in amount from 0.68 to 0.82 pounds in 100 pounds of milk, and averaged 0.77 pounds.

2. Pounds of albumen lost in whey for 100 pounds of milk.

a. Factory experiments.—The albumen lost in the whey varied from 0.49 to 0.54 pounds, and averaged 0.51 pounds.

b. Station experiments.—The amount of albumen lost varied from 0.62 to 0.69 pounds, an average of .65 pounds.

3. Per cent of albumen in milk lost in whey.

a. Factory experiments.—Of the albumen in the milk, from seventy to over eighty-three per cent was lost in the whey, with an average of about 77.3 per cent, while 22.7 per cent was recovered in the cheese.

b. Station experiments.—From 77.8 to 91.2 per cent of the albumen in the milk was lost in the whey, the average loss being 84.4 per cent, leaving 14.6 as the per cent recovered in the cheese.

4. General summary:

In all the experiments the average amount of albumen in 100 pounds of milk was 0.72 pounds, of which 0.59 pounds (about ten ounces) were lost in the whey, and 0.13 pounds (about two ounces) recovered in the cheese. On an average, about eighty-two per cent of the albumen in the milk was lost, while eighteen per cent was recovered in the cheese.

It appears that, on an average, for every ounce of caseine lost in the whey, four-fifths of one ounce of albumen were recovered in the cheese, so that the general result is the same as if all the albumen were lost and, in addition, a small amount of caseine.

Relation of Caseine to Albumen in Milk.

We have seen in the preceding pages that rather small quantities of caseine are lost in cheese-making, while over eighty per cent of the albumen passes into the whey. It is, therefore, evident that the amount of loss of nitrogen compounds will be proportional to the amount of albumen in the milk. It then becomes a matter of both scientific and practical interest to determine what proportion of the caseine and albumen in milk consists of albumen and what proportion consists of caseine.

The following questions suggest themselves as highly important to determine:

(1.) Does the ratio of albumen to caseine vary or is it fairly uniform?

(2.) If it varies, to what causes are the variations due? Do the stage of lactation, kind of feed, breed and other conditions produce variations in the relation of albumen to caseine? In connection with this particular investigation, we can ascertain only whether the relation varies and perhaps whether it varies with stage of lactation. In connection with our comparative investigation of dairy breeds, we shall be able to study the question more in detail.

TABLE SHOWING RELATION OF CASEINE TO ALBUMEN IN MILK.

NUMBER OF EXPERI- MENT.	Pounds of caseine and albumen in 100 lbs. of milk.	Pounds of caseine in 100 lbs. of milk.	Pounds of albu- men in 100 lbs. of milk.	Pounds of caseine for 100 lbs. of casein and albu- men together.	Pounds of albu- men for 100 lbs. of caseine and al- bumen together.	Pounds of caseine for one lb. of al- bumen in milk.
3.....	2.67	1.98	0.69	74.16	25.84	2.9
1.....	2.60	1.98	0.62	76.15	23.85	3.2
5.....	2.72	2.06	0.66	75.74	24.26	3.1
4.....	2.63	2.03	0.60	77.19	22.81	3.4
2.....	2.53	1.93	0.60	76.28	23.72	3.2
6.....	2.78	2.01	0.77	72.30	27.70	2.6
7.....	3.46	2.69	0.77	77.74	22.26	2.5
11.....	3.40	2.72	0.68	80.00	20.00	4.0
9.....	3.35	2.63	0.72	78.50	21.50	3.6
12.....	3.41	2.60	0.81	76.25	23.75	3.2
13.....	3.50	2.68	0.82	76.57	23.43	3.3
14.....	3.50	2.68	0.82	76.57	23.43	3.3
10.....	3.50	2.72	0.78	77.71	22.29	3.5
8.....	3.46	2.73	0.73	78.90	21.10	3.7

Statement of Results.

1. Pounds of caseine and albumen in 100 pounds of milk:

a. Factory experiments.—The amount of caseine and albumen together averaged 2.65 pounds, varying from 0.12 below to 0.13 pounds above this average.

b. Station experiments.—The caseine and albumen averaged, in amount, 3.45 pounds, varying from 0.10 below to 0.05 pounds above this average.

2. Pounds of caseine in 100 pounds of milk:

a. Factory experiments.—The caseine in the milk averaged two pounds, varying from 0.07 pounds below to 0.06 pounds above this average.

b. Station experiments.—The caseine averaged 2.68 pounds, varying from 0.08 pounds below to 0.05 pounds above this average.

3. Pounds of albumen in 100 pounds of milk:

a. Factory experiments.—The amount of albumen averaged 0.66 pounds, varying from 0.06 below to 0.11 above the average.

b. Station experiments.—The albumen averaged 0.77 pounds, varying from 0.09 pounds below to 0.05 pounds above the average.

4. Pounds of caseine present in 100 pounds of caseine and albumen taken together.

a. Factory experiments.—The proportion of caseine varied from 72.3 pounds to 77.19 pounds for each hundred pounds of caseine and albumen, the average being 75.3 pounds.

b. Station experiments.—For each 100 pounds of caseine and albumen together in the milk, the caseine varied from 76.25 to eighty pounds, the average being 77.8 pounds.

5. Pounds of albumen present in 100 pounds of caseine and albumen taken together:

a. Factory experiments.—The albumen in the milk amounted to from 22.81 pounds to 27.7 pounds for 100 pounds of caseine and albumen, the average being 22.2 pounds.

It was previously shown that, in the factory experiments, the per cent of loss of caseine and albumen was somewhat greater than in the station experiments. The explanation of this difference is probably to be found in the fact that the factory milks contained a larger proportion of albumen relative to the caseine.

6. Pounds of caseine for one pound of albumen in milk:

a. Factory experiments.—For each pound of albumen in the milk, the caseine varied from 2.6 pounds to 3.4 pounds, with an average of 3.1 pounds.

b. Station experiments.—For each pound of albumen in the milk, the caseine varied from 3.2 pounds to four pounds, with an average of 3.5 pounds.

7. General summary.

In all of the experiments, the average amount of caseine and albumen was 3.10 pounds for 100 pounds of milk; of this amount, about 2.4 pounds, or 77.4 per cent, consisted of caseine, while about 0.7 pounds, or 22.6 per cent, consisted of albumen. There were, on an average, about 3.3 pounds of caseine to one pound of albumen. There was a marked difference in the two kinds of milk.

Influence of Relation of Fat to Caseine and Albumen in Milk on Loss of these Compounds in Cheese-making.

In the experiments of last year there appeared to be some relation, though not very uniform, between the loss of fat and the amount of caseine and albumen in the milk relative to the fat. When the caseine exceeded the fat in amount, as in skim-milk, the loss of fat was considerably larger than in the caseine and albumen. It is desirable to know if such a relation exists, or whether the tendency shown by the results of our last year's work was accidental.

TABLE SHOWING LOSS OF FAT AND OF CASEINE AND ALBUMEN IN CHEESE-MAKING AS INFLUENCED BY PROPORTION OF FAT TO CASEINE AND ALBUMEN IN MILK.

NUMBER OF EXPERIMENT.	Pounds of fat for one pound of caseine and albumen in milk.	Per cent of fat in milk lost in whey.	Per cent of caseine and al- bumen in milk lost in whey.
8	1.14	8.55	23.67
1	1.17	7.51	23.46
3	1.14	6.33	23.46
4	1.25	1.31	24.33
2	1.33	5.6	24.2
6	1.21	6.15	24.45
7	1.38	5.71	24.54
11	1.17	7.11	24.24
9	1.23	7.43	24.44
12	1.23	7.21	25.45
13	1.12	7.1	23.44
14	1.12	5.74	23.44
5	1.25	7.1	24.1
10	1.22	3.57	23.12

Statement of Results.

1. Fat lost in whey, as influenced by amount of caseine and albumen in milk:

a. Factory experiments.—The loss of fat in experiments 3, 1 and 5 was a little less than in 4, 2 and 6; in the former there was less fat relative to the caseine. A comparison of individual experiments, however, shows that the loss of fat was quite independent of the relation of the fat to the caseine and albumen.

b. Station experiments.—The loss of fat was least when the ratio of fat to caseine and albumen was greatest, and, in general, the amount of fat relative to the caseine and albumen appears to have had little or no influence upon the amount of fat lost. The variations noticed were more largely due to differences in conditions of manufacture.

2. Caseine and albumen lost in whey, as influenced by amount of fat in milk:

We have already seen that the amount of caseine and albumen lost is largely dependent upon the amount of albumen in the milk, and the variations of loss appear to be entirely independent of the amount of fat in the milk.

Influence of Composition of Milk on Composition of Cheese.

Under this head, we will consider the following points:

1. The influence of fat in milk on composition of cheese.
2. The influence of caseine and albumen in milk on composition of cheese.
3. Influence of relation of fat to caseine and albumen in milk on composition of cheese.
4. Relation of fat to caseine and albumen in cheese as a basis for determining the character of milk.

In connection with the general subject of the relation of the composition of milk to the composition of cheese, several interesting questions suggest themselves: Which affects the composition of cheese more, the composition of milk or the conditions

of manufacture? Can we, under like conditions of manufacture, calculate closely the composition of cheese that milks of different composition will make? Or, can we, from knowing the composition of a cheese, determine the composition of the milk from which the cheese was made? These questions are of great importance and practical interest, and we hope that this season's work will enable us to answer them with some degree of definiteness.

Influence of Fat in Milk on Composition of Cheese.

In stating the amount of fat in cheese in the table below, the figures are used to represent the amount of fat in the dry or water-free cheese. For example, in experiment No. 3, the green cheese contains 33.7 of fat in 100 pounds of cheese, and 37.3 pounds of water. But if the water were removed completely, the dried cheese would contain 53.8 pounds of fat in 100 pounds. This method of calculating the results is rendered necessary from the fact that, in curing, the cheese is steadily losing moisture, and the per cent of fat is becoming larger, though the actual amount of fat in the cheese is the same. By calculating the fat in 100 pounds of water-free cheese, we have a uniform basis for comparing our results, whether we take an analysis of green or cured cheese. The last column of figures in the table below is obtained by dividing the number of pounds of fat in 100 pounds water-free cheese by the number representing the amount of fat in 100 pounds of milk, and the results represent the number of pounds of fat in 100 pounds of cheese for each pound of fat in the milk from which the cheese was made, or the ratio of per cent of fat in milk to per cent of fat in water-free cheese.

TABLE SHOWING RELATION OF FAT IN MILK TO FAT IN CHEESE.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of fat in 100 lbs. of water- free cheese.	Pounds of fat in 100 lbs. of water- free cheese for one lb. of fat in milk.
3	3.04	53.8	17.7
1	3.05	52.9	17.3
5	3.10	52.2	16.8
4	3.28	55.2	16.8
2	3.37	56.1	16.6
6	3.37	54.0	16.0
7	3.56	50.1	14.1
11	4.15	54.6	13.2
9	4.20	56.2	13.4
12	4.20	54.4	13.0
13	4.28	55.5	13.0
14	4.28	55.5	13.2
10	4.38	56.6	12.9
8	6.00	63.4	10.6

Statement of Results.

1. Amount of fat in 100 pounds of milk:
 - a. Factory experiments.—The fat varied from 3.04 to 3.37 pounds and averaged 3.20 pounds in 100 pounds of milk.
 - b. Station experiments.—The fat varied from 3.56 to 6 pounds, and averaged 4.38 pounds in 100 pounds of milk.
2. Amount of fat in 100 pounds of water-free cheese:
 - a. Factory experiments.—The fat varied from 52.2 to 56.1 pounds, and averaged 54.3 pounds, for 100 pounds of water-free cheese.
 - b. Station experiments.—The fat varied from 50.1 to 63.4 pounds, and averaged 55.9 pounds in 100 pounds of cheese.
3. Pounds of fat in 100 pounds of cheese for one pound of fat in milk.
 - a. Factory experiments.—The ratio of per cent of fat in milk to per cent of fat in cheese varies from 16 to 17.7 pounds, and averaged 16.9 pounds.

b. Station experiments.—The ratio varied from 10.6 to 14.1 pounds, and averaged 12.9 pounds.

4. An examination of the second and third columns of the table above indicates that, in general, the amount of fat in a cheese tends to increase, but not uniformly, when the amount of fat in the milk increases. For example, green cheese made from normal milk containing three per cent of fat contains about thirty-three per cent of fat, but green cheese made from milk containing six per cent of fat will not contain sixty-six per cent of fat, but only about forty-two per cent of fat.

5. The ratio of per cent of fat in milk to per cent of fat in water-free cheese decreases, but not with exact uniformity, as the fat in the milk increases. This would follow, from what has been said above, since the fat in cheese does not increase in the same proportion as fat in milk increases.

6. General summary:

If we group the results of the various experiments, taking the average of each group, we can tabulate the results as follows:

NUMBER OF EXPERIMENTS.	Pounds of fat in 100 pounds of milk.	Pounds of fat in 100 pounds of water-free cheese.	Pounds of fat in 100 pounds of water-free cheese for one pound of fat in milk.
3, 1, 5	3.05	53.0	17.3
4, 2, 6	3.35	55.1	16.5
7 *	3.35	50.1	14.1
11, 9, 12	4.20	55.1	13.2
13, 14, 10	4.30	56.2	13.0
8 *	6.00	63.4	10.6

The results embodied in the above table are not sufficiently numerous to enable us to make any general conclusions; but it is plainly indicated that the amount of fat in cheese is largely dependent upon the amount of fat in the milk, though this may doubtless be modified to some extent by variations in conditions of manufacture.

* The milk was not normal.

INFLUENCE OF CASEINE AND ALBUMEN IN MILK ON
COMPOSITION OF CHEESE.

Table Showing Relation of Caseine and Albumen in Milk to
Caseine and Albumen in Cheese.

NUMBER OF EXPERIMENT.	Pounds of case- ine and albu- men in 100 lbs. of milk.	Pounds of case- ine and albu- men in 100 lbs of water-free cheese.	Ratio of caseine and albumen in milk to case- ine and albu- men in cheese.
3	2.67	38.4	14.4
1	2.60	38.1	14.6
5	2.72	38.1	14.0
4	2.63	36.8	14.0
2	2.53	36.7	14.5
6	2.78	36.7	13.2
7*	3.46	41.1	11.9
11	3.40	36.0	10.6
9	3.35	36.8	11.0
12	3.41	36.4	10.7
13	3.50	36.0	10.3
14	3.50	36.2	10.3
10	3.50	37.3	10.7
8*	3.46	30.4	8.8

Statement of Results.

1. Pounds of caseine and albumen in 100 pounds of milk:

a. Factory experiments.— The amount of caseine and albumen in 100 pounds of milk varied from 2.53 to 2.78 pounds, and averaged 2.65 pounds.

b. Station experiments.— The caseine and albumen varied from 3.35 to 3.50 pounds, and averaged 3.45 pounds in 100 pounds of milk.

2. Pounds of caseine and albumen in 100 pounds of water-free cheese:

a. Factory experiments.— The amount of caseine and albumen varied from 36.7 to 38.4 pounds in 100 pounds of water-free cheese, and averaged 37.5 pounds.

* Milk was not normal.

b. Station experiments.—Taking only the cheese made from normal milks, the caseine and albumen varied from 36 to 37.3 pounds in 100 pounds of water-free cheese, and averaged 36.5 pounds.

3. Effect of skimming milk and adding cream to milk upon the proportion of caseine and albumen in cheese:

In experiment No. 7, in which the fat was partially removed from the milk, the effect was to increase, relatively, the amount of caseine and albumen, rising to 4.1 pounds in 100 pounds of water-free cheese, which is considerably greater than the amount found in any case where normal milk was used.

In experiment No. 8, in which the milk was enriched by the cream taken from the milk used in experiment No. 7, the effect was to diminish relatively the amount of caseine and albumen in both the milk and cheese, the amount of caseine and albumen dropping to 30.4 pounds in 100 pounds of water-free cheese, which is considerably less than the amount found in any case where normal milk was used.

4. Ratio of caseine and albumen in milk to caseine and albumen in cheese:

a. Factory experiments.—The ratio varied from 13.2 to 14.6 pounds, and averaged 14.1 pounds.

b. Station experiments.—Omitting those experiments in which the milk was not normal, the ratio varied from 10.3 to 11 pounds, and averaged 10.6 pounds.

The effect of removing fat from normal milk was to increase the ratio, while the effect of adding fat to normal milk was to diminish the ratio.

5. An examination of the second and third columns in the above table shows that in the cheese made from normal milk the amount of caseine and albumen is a fairly uniform quantity; the tendency is for the milks containing least fat to make cheese containing somewhat more caseine and albumen. Skimming or adding cream to any extent produces a marked change in the relative amount of caseine and albumen in cheese.

General Summary.

Grouping the results of experiments in which milk of similar composition was used, we have the following results:

NUMBER OF EXPERIMENT.	Pounds of caseine and albumen in 100 lbs. of milk.	Pounds of caseine and albumen in 100 lbs of water-free cheese.	Ratio of caseine and albumen in milk to caseine and albumen in cheese.
1, 2, 4.....	2.60	37.5	14.4
3, 5, 6.....	2.70	37.7	13.9
9, 11, 12.....	3.40	36.4	10.7
10, 13, 14	3.50	36.5	10.4
7*	3.46	41.1	11.9
8*	3.46	30.4	8.8

The results embodied in the above table indicate that, in case of normal milk, cheese made from milk low in caseine and albumen (and also low in fat) contains a little more caseine and albumen than cheese made from milk richer in fat, caseine and albumen. Milk from which fat has been removed produces cheese much higher in caseine and albumen than normal milk, while milk to which cream has been added produces cheese much lower in caseine than does normal milk.

INFLUENCE OF RELATION OF FAT TO CASEINE AND ALBUMEN IN MILK ON COMPOSITION OF CHEESE.

Rearranging data previously presented we have the following table:

NUMBER OF EXPERIMENT.	Pounds of fat for one pound of caseine and albumen.	Pounds of fat in 100 pounds of water-free cheese.	Pounds of caseine and albumen in 100 lbs. of water-free cheese.
7*	1.03	50.1	41.1
3, 1, 5	1.15	53.0	38.2
4, 2, 6	1.26	55.1	36.7
9 to 14	1.23	55.6	36.5
8*	1.73	63.4	30.4

* Milk was not normal.

Statement of Results.

1. In the normal milks the amount of fat relative to the caseine did not vary greatly. In those cases, where the normal milk contained the fats in amounts not larger than the caseine and albumen, the proportion of fat was least in the cheese, while that of caseine and albumen was greatest.

2. In experiment No. 7, in which some fat was removed from the milk, the fat was very nearly the same in amount as the caseine and albumen being as 1.03 to 1.00. In the cheese, the fat was least of all in amount; the caseine and albumen, largest in amount.

3. In experiment No. 8, in which some cream was added to the normal milk, the fat was much larger in amount than the caseine and albumen, being as 1.73 to 1.00. In the cheese made from this milk, the fat was greatest in amount, while the caseine and albumen were least.

**Relation of Fat to Caseine and Albumen in Cheese as a Basis
for Determining the Character of Milk.**

We have already seen that the amount of caseine and albumen in normal milk bears a fairly definite relation to the amount of fat, and that removal of fat from, or addition of fat to, normal milk, to any appreciable extent, changes this relation very noticeably. The question arises, can we trace any definite relation between the fat and the caseine and albumen in cheese which will enable us to tell whether or not the milk from which the cheese was made was normal or not?

The data in the table below have been previously presented in other tables, except those contained in the last column, which are obtained by dividing the amount of fat by the amount of caseine and albumen contained in 100 pounds of water-free cheese.

end of this season, establish some relation between the composition of cheese and milk, such that, from knowing one, we can closely calculate the composition of the other.

INFLUENCE OF COMPOSITION OF MILK ON YIELD OF CHEESE.

TABLE SHOWING RELATIONS OF MILK CONSTITUENTS TO YIELD OF CHEESE.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of caseine and albumen in 100 lbs. of milk.	Pounds of green cheese made from 100 lbs. of milk.	Pounds of water in cheese from 100 lbs. of milk.	Pounds of fat in cheese from 100 lbs. of milk.	Pounds of caseine and albumen in cheese from 100 lbs. of milk.	Pounds of ash, etc., in cheese from 100 lbs. of milk.
3.....	3.04	2.67	8.47	3.16	2.85	2.04	0.42
1.....	3.05	2.60	8.54	3.19	2.83	2.04	0.48
5.....	3.10	2.72	8.62	3.27	2.80	2.04	0.51
4.....	3.28	2.63	9.05	3.35	3.15	2.10	0.45
2.....	3.37	2.53	8.75	3.19	3.12	2.04	0.40
6.....	3.37	2.78	9.13	3.34	3.13	2.13	0.53
7*	3.56	3.46	10.20	3.72	3.24	2.66	0.58
11.....	4.15	3.40	11.25	3.85	4.04	2.66	0.70
9.....	4.20	3.35	11.00	3.91	3.97	2.60	0.52
12.....	4.20	3.41	11.00	3.69	3.98	2.66	0.67
13.....	4.28	3.50	11.35	4.04	4.17	2.71	0.63
14.....	4.28	3.50	11.25	3.85	4.17	2.67	0.56
10.....	4.38	3.50	11.10	3.92	4.06	2.68	0.44
8*	6.00	3.46	13.30	4.48	5.58	2.68	0.56

Yield of Green Cheese from One Hundred Pounds of Milk.
Statement of Results.

- 1. Factory experiments.— The yield of cheese from 100 pounds of milk varied from 8.47 to 9.13 pounds, and averaged 8.75 pounds.
 - 2. Station experiments.— In the cases where normal milk was used, the yield of cheese varied from 11 to 11.55 pounds, and averaged 11.2.
- It remains to ascertain the reasons for the variations noted.

* Milk was not normal.

**AMOUNT OF WATER RETAINED IN CHEESE MADE FROM ONE
HUNDRED POUNDS OF MILK.**

Statement of Results.

An examination of the table above (fifth column) shows that the amount of water retained in the cheese, from 100 pounds of milk, is quite variable and increases when the solids of the milk (fat, caseine, etc.) increase. Grouping together the results in the case of milks of similar composition, we obtain the following table:

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of caseine and al- bumen in 100 lbs. of milk.	Pounds of water in cheese from 100 lbs. of milk.
9, 1, 5.....	3.05	2.65	3.20
4, 2, 6.....	3.35	2.65	3.30
7*.....	3.56	3.46	3.70
9, 11, 12.....	4.20	3.40	3.80
10, 13, 14.....	4.30	3.50	3.95
8*.....	6.00	3.46	4.50

The amount of moisture retained in the cheese made from 100 pounds of milk increases when the fat increases, even though the caseine and albumen remain uniform in amount. It appears also, from the seventh experiment, that the retention of water may be increased by increase of caseine and albumen when there is no increase of fat in the milk.

It will be seen from the accompanying table that the amount of water retained by the cheese made from 100 pounds of milk increased from 3.20 to 4.50 pounds, or about one and one-third pounds; the fat in the milk increased at the same time from about three to six pounds, and the caseine and albumen from 2.65 to 3.46 pounds.

* Milk was not normal.

Amount of Fat Retained in Cheese Made from One Hundred Pounds of Milk.

Statement of Results.

An examination of the general table above (sixth column) shows that the fat retained in cheese increases when the amount of fat in the milk increases, but not with exact uniformity.

The rearrangement of results by groups gives the following:

NUMBER OF EXPERIMENT.	Pounds of fat in 100 pounds of milk.	Pounds of fat in cheese from 100 pounds of milk.
3, 1, 5.	3.05	2.83
4, 2, 6.	3.55	3.13
7*	3.56	3.24
9, 11, 12.	4.20	4.00
10, 13, 14.	4.30	4.10
8*	6.00	5.58

It has already been stated that the results appear to indicate that increase of fat in milk is accompanied by an increase of water in the cheese made from 100 pounds of milk. It would, therefore, appear that increase of fat in milk increases the yield of cheese in two ways. First, by increasing the amount of fat retained in cheese from 100 pounds of milk, and, second, by increasing the amount of moisture retained.

Amount of Caseine and Albumen Retained in Cheese Made from One Hundred Pounds of Milk.

Statement of Results.

1. An examination of the general table above (seventh column) shows that the amount of caseine and albumen retained in the cheese made from 100 pounds of milk increases when the caseine and albumen in the milk increase, and with considerable uniformity.

a. Factory experiments.—The amount of caseine and albumen retained in the cheese was very uniform, varying from 2.04 to 2.13 pounds, and averaging 2.06 pounds.

* Milk was not normal.

b. Station experiments.—The amount of caseine and albumen retained was very uniform, varying from 2.60 to 2.71, and averaging 2.66 pounds.

Influence of Different Milk-Constituents in Increasing Yield of Cheese.

In order to ascertain to what particular constituents of the milk the increase of cheese was due, we will rearrange the data presented in the general table above:

NUMBER OF EXPER- IMENT.	YIELD OF CHEESE FROM 100 POUNDS OF MILK.		POUNDS OF FAT IN CHEESE FROM 100 POUNDS OF MILK.		POUNDS OF CASEINE AND ALBUMEN IN CHEESE FROM 100 POUNDS OF MILK.		POUNDS OF WATER, ASH, ETC., IN CHEESE FROM 100 POUNDS OF MILK.	
	Increase of yield.	Decrease of yield.	Increase of fat in cheese.	Decrease of fat in cheese.	Increase of caseine and albumen in cheese.	Decrease of caseine and albumen in cheese.	Increase of water, etc., in cheese.	Decrease of water, etc., in cheese.
3 .....	.....	.....	.....	.....	.....	.....	.....	.....
1	0.07	.....	.....	0.02	.....	.....	0.09	.....
5	0.15	.....	.....	0.05	.....	.....	0.20	.....
4	0.58	.....	0.30	.....	0.06	.....	0.22	.....
2	0.28	.....	0.27	.....	.....	.....	0.01	.....
6	0.66	.....	0.28	.....	0.09	.....	0.29	.....
7	1.73	.....	0.39	.....	0.62	.....	0.72	.....
11	2.78	.....	1.19	.....	0.62	.....	0.97	.....
9	2.53	.....	1.12	.....	0.56	.....	0.85	.....
12	2.53	.....	1.13	.....	0.62	.....	0.78	.....
13	3.08	.....	1.32	.....	0.67	.....	1.09	.....
14	2.78	.....	1.32	.....	0.63	.....	0.83	.....
10	2.63	.....	1.21	.....	0.64	.....	0.78	.....
8	4.83	.....	2.73	.....	0.64	.....	1.46	.....

The order of arrangement of experiments is the same as that previously followed, the amount of fat in the milk serving as the basis, commencing with the lowest.

The yield of cheese and of cheese constituents in the experiment placed first is taken as a starting point and is compared with each following experiment. When the yield is greater than in the first cheese, the difference or increase is placed under the column thus designated; where the yield is less than in the first case, the dif-

ference or decrease is placed in its appropriate column. It will be seen that there was an increase of yield over the first in all cases, and that in only two cases was there a decrease in any of the constituents.

Statement of Results.

A careful examination of the results embodied in the above table suggests the following indications:

1. Influence of fat on yield of cheese:

a. In experiments 1 and 5, the increased yield of cheese was due in both cases to increased amount of moisture retained, for there was a slight diminution in fat, the caseine and albumen remaining the same as in No. 3.

b. In experiments 4, 2 and 6, the increased yield of cheese varied from 0.28 pounds to 0.66 pounds, the average increase being 0.5 pounds; of this amount of increase, 0.28 pounds came from fat, 0.05 from caseine and albumen, and 0.17 pounds from moisture, etc.; in other words, 56 per cent of the increased yield came from fat.

c. In experiments 9 to 14, in which normal milk was used, the average increase of yield of cheese was 2.72 pounds for each 100 pounds of milk; of this amount of increase, 1.22 pounds were due to fat; that is about 45 per cent.

d. In experiment 7, where partially skimmed-milk was used, the increased yield of cheese amounted to 1.73 pounds, of which 0.39 pounds, or about 23 per cent, came from fat.

e. In experiment 8, where milk was used to which cream had been added, the increased yield amounted to 4.83 pounds, of which 2.73 pounds, or over 56 per cent was due to fat.

2. Influence of caseine and albumen on yield of cheese:

a. In experiments 1, 2 and 5, no increase of yield was due to caseine and albumen, while in 4 and 6, only a small amount of increase was due to caseine and albumen.

b. In the other experiments, 7 to 14, the caseine and albumen contributed from 0.56 to 0.67 pounds of increase, an average of about 0.62 pounds; this amounted to about 22 per cent of the whole increase of yield.

3. Influence of water on yield of cheese:

a. In the first six experiments, the yield of cheese was increased by water about 0.16 pounds, or about 45 per cent of the increased yield of cheese was due to water.

b. In experiments 9 to 14, in which normal milk was used, the average amount of increased yield due to water was 0.88 pounds, or about 32 per cent.

General Summary.

Omitting experiments 3, 1 and 5, and averaging the others, we obtain the following averages:

	Pounds.	Per cent.
Average increased yield of cheese.....	2.22	....
Average increased yield of fat.....	1.02	46
Average increased yield of caseine and albumen....	0.47	21
Average increased yield of water.....	0.73	33

In these experiments, we can say that nearly one-half of the increased yield of cheese was due to increase of fat; a little over one-fifth was due to increase of caseine and albumen; and about one-third was due to increased retention of water. So far as the average of these results indicate any thing, we should expect, in case of milk ranging from three to four per cent of fat, that an increase of one-tenth of one pound of fat in 100 pounds of milk would produce an increased yield of cheese of something over two-tenths of a pound.

Relation of Fat in Milk to Yield of Cheese.

It is desirable, in this connection, to notice how much cheese was made in each case for one pound of fat in the milk. It is generally believed that milk poor in fat makes more cheese in proportion to its fat than does milk richer in fat. It is of practical importance to know to what extent this is true, if the fat in the milk is to be used as a basis for paying for milk.

TABLE SHOWING RELATION OF FAT IN MILK TO YIELD OF CHEESE.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of cheese made from 100 lbs. of milk.	Pounds of cheese made for each pound of fat in milk.
3.....	3.04	8.47	2.79
1.....	3.05	8.54	2.80
5.....	3.10	8.62	2.78
4.....	3.28	9.05	2.76
2.....	3.37	8.75	2.60
6.....	3.37	9.13	2.71
7*.....	3.56	10.20	2.85
11.....	4.15	11.25	2.71
9.....	4.20	11.00	2.62
12.....	4.20	11.00	2.62
13.....	4.28	11.55	2.70
14.....	4.28	11.25	2.63
10.....	4.38	11.10	2.54
8*.....	6.00	13.30	2.22

Statement of Results.

1. Pounds of cheese made for each pound of-fat in the milk:

a. Factory experiments.—The amount of cheese made for each pound of fat in the milk varied from 2.71 to 2.80 pounds in five out of the six experiments, in one case the number being 2.60 pounds. The average of the six was 2.74 pounds.

b. Station experiments.—Omitting the experiments in which abnormal milk was used, the others varied from 2.54 to 2.71 pounds of cheese for each pound of fat in milk; they averaged 2.65. In No. 7, the ratio was greater, and in No. 8, it was less than in case of the normal milks.

Grouping and averaging the experiments as in previous cases, we have the following table.

* Milk was not normal.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of cheese made from 100 lbs. of milk.	Pounds of cheese made for each lb. of fat in milk.
3, 1, 5.....	3.06	8.54	2.79
4, 2, 6.....	3.30	8.98	2.69
9, 11, 12.....	4.20	11.08	2.65
10, 13, 14.....	4.30	11.30	2.66
7.....	3.56	10.20	2.85
8.....	6.00	13.30	2.22

In the experiments in which normal milk was used, if we take milk containing about three per cent of fat, and milk containing about 4.25 per cent of fat, we find that, in the poorer milk, one pound of fat made about one-eighth of a pound more of cheese than did one pound of fat in the richer milk. When cheese sells at ten cents a pound, this would make a difference of 1.3 cents for each pound of fat in milk; that is, if the producer of the three-per-cent milk received twenty-five cents a pound for the fat in his milk, the producer of the richest milk would receive 23.7 cents for each pound of fat in his milk. This recognizes no difference in the quality of the cheese made from these two kinds of milk. If cheese made from milk containing 3 per cent of fat sells for 10 cents, cheese equally well made from milk containing 4.25 per cent of fat ought to sell for, at least, 10.5 cents, and, in this case, the money received for one pound of fat in milk would be the same for the producers of the two kinds of milk. While it is true that one pound of fat in milk will make more cheese than will one pound of fat in a richer milk, yet, when we come to consider the difference that ought to exist in the quality of the two products, the cheese made from the richer milk should sell for enough more to make up for the smaller yield in proportion to its fat.

It is hoped that the data which will be secured during the summer will enable us to reach some conclusion that may be regarded as thoroughly satisfactory. Our present data are of value as suggestions rather than as a basis for definite conclusions.

Why the Factory Milk in May Produced a Small Yield of Cheese.

In connection with our consideration of the influence of the composition of milk upon the yield of cheese, this is a suitable place to answer the question which the factory work in May was especially intended to study. Why does it require more factory-milk to make a pound of cheese in May than at any time subsequent?

If we average the six factory milks, we shall have the following average composition for fat, caseine and albumen:

Pounds of fat in 100 pounds of milk.....	3.20
Pounds of caseine and albumen in 100 pounds of milk.....	2.65

Of this fat, about three-tenths of a pound was lost in making, leaving for cheese about 2.90 pounds. Of the 2.65 pounds of caseine and albumen, 0.65 pounds were lost, leaving for cheese two pounds.

In addition to the above, about five-tenths of a pound of other solids, as ash, salt, etc., and about 3.25 pounds of water were retained in the cheese. These, added together, make about 8.65 pounds of cheese from 100 pounds of milk, or, in other words, it required on an average over 11.5 pounds of milk to make one pound of cheese.

The reason for this low yield is explained by the composition of the milk. The milk-constituents which most influence cheese-production, the fat and caseine, were present in small quantities, and, from milk of such composition, a higher yield could not be expected. The losses in manufacture were not so excessive as to affect the yield seriously, and we must attribute the small yield of cheese to the poor quality of the milk.

It is highly probable that the poor character of the milk was due to the fact that most of the cows were in the earlier stage of the lactation period. It is more reasonably accounted for in this way than to suppose that the producers of the milk were feeding their cows poor food in insufficient quantities, a supposition likely to be untrue in regard to most of the farmers.

Influence of Variation of Conditions of Manufacture upon Yield of Cheese.

1. Yield of cheese is affected by using different amounts of rennet.

Statement of Results.

No difference of yield was shown that could be attributed to variation in the amount of rennet used, two sets of comparisons being made, experiments No. 9 and 10, and 11 and 12.

2. Yield of cheese as affected by cutting curd in soft and hard state.

In experiments 4 and 13 the curd was cut soft, in 14 very hard; in other experiments, in ordinary condition. The comparison of 4 and 5 was unsatisfactory, because the two milks were not alike in composition. In experiments 13 and 14 the soft curd gave a little larger yield, owing mainly to the retention of more water.

Loss of Cheese in Weight for First Month.

It was not practicable to secure the weights of the factory cheese and, therefore, we give under this head only the station experiments.

TABLE SHOWING LOSS OF CHEESE IN WEIGHT.

NUMBER OF EXPERIMENT.	Weight of cheese when green.	Weight of cheese when one month old.	Pounds lost in four weeks.	Pounds of loss in weight in four weeks for 100 pounds of cheese.
7	25.5	23.8	1.7	6.67
11	33.8	30.8	3.0	8.87
9	30.3	28.0	2.3	7.60
12	33.1	30.9	2.2	6.65
13	31.8	29.4	2.4	7.55
14	31.0	29.3	1.7	5.50
10	30.6	28.7	1.9	6.20
8	33.2	31.0	2.2	6.60

Statement of Results.

The loss of weight varied during the first month from 1.7 to 3 pounds, and averaged about 2.2. Calculating for 100 pounds of cheese, the loss varied from 5.5 to 8.87 pounds, and averaged 6.95 pounds.

COMMERCIAL QUALITIES OF CHEESE.

When two months old, the cheeses that were made at the station in May, were examined by me. Below are given the results of the examination in respect to the qualities of flavor, body, texture, color and appearance. In addition to the description is given a table in which is marked the number of points scored by each cheese in respect to the qualities mentioned above. The scale of marking was suggested by Prof. J. W. Robertson, and the number opposite each word indicates the highest value that can be assigned for that particular quality:

Flavor (when perfect)	40
Body (when perfect)	25
Texture (when perfect)	15
Color (when perfect)	15
Appearance (when perfect)	5

It may be well, in this connection, to state more in detail what is meant by the qualities of cheese. Probably different individuals may not always agree in every respect in regard to the use of these terms, and we certainly know that individual judgments may differ much in pronouncing upon the qualities of the same cheese. But we will describe the terms as they will be used in our cheese bulletins. There are many variations of each quality known to experts, but we notice only the more common.

Flavor.

By flavor, as applied to cheese, is meant the odor of the cheese, or the odor and taste combined. The sense of smell is, as a rule, more sensitive in detecting variations of flavor in cheese than the taste. The usual method of determining flavor is to rub a small portion of cheese between the fingers, by which the cheese is crushed and warmed somewhat, when the odor becomes more perceptible than it would without such treatment. In this way, slight traces of flavor are recognized, which would escape detection by any casual examination. The flavor of a cheese is perfect

when it resembles that of first-class butter. It is said to be "tainted" when it resembles the odor of the cow or stable; cheese is said to be "off flavor" when it has become over-ripe, and has something of the odor of rancid butter. The causes that produce variations in the flavor of cheese were briefly discussed in the Report of Geo. A. Smith to the New York State Dairy Commissioner, to be found in the Eighth Annual Report of said commissioner.

Body.

The term "body" as used in reference to cheese, is difficult to define briefly; it means about the same substance. A cheese is said to have a perfect "body," when it is solid, firm and smooth in substance. The body of cheese is ascertained by pressing some of the cheese between the fingers. If the cheese is compact, it is said to be solid in body; if, when pressed between the fingers, it shows a certain amount of resistance, somewhat like that shown by fat pork when pressed between the fingers, the body is said to be firm. When the cheese, under pressure between the fingers, feels smooth and velvety, and not hard or gritty, it is said to have a smooth body. An increased amount of fat in cheese produces, as a rule, diminished firmness or greater softness and increased smoothness.

Texture.

The texture in cheese may be fine and close or porous. When the texture is perfect, the inside of the cheese presents to the eye a solid, compact, continuous appearance, free from holes and chunks.

Color.

Cheese, whether artificially colored or free from any artificial coloring, should be uniform in color and free from any mottled appearance. The degree of artificial coloring depends upon the popular taste which is variable.

Appearance.

This refers to the external appearance of cheese. Without going into details, it should be such as to impress one with perfection of form and general neatness.

Table Showing Comparison of Station Cheeses in Quality.

Number of ex- periments.	KINDS OF CHEESE.	Date of manufacture.	Special condition of manufacture.	Flavor.	Body.	Texture.	Color.	Appearance.	Total number of marks.	Date of exam- ination.
7	Cheddar	May 24	Milk partially skimmed 3.56 per cent of fat. . .	40	25	15	15	5	100	July 26.
8	Cheddar	May 24	Milk and cream, 6 per cent of fat.	40	20	15	15	5	95	July 26.
9	Stirred-curd. .	May 25	Usual amount of rennet.	30	25	15	15	5	90	July 26.
10	Cheddar	May 25	Very small amount of rennet.	35	25	15	15	5	95	July 26.
11	Cheddar	May 26	Four ounces of rennet. .	40	25	15	15	5	100	July 26.
12	Cheddar	May 26	Eight ounces of rennet. .	35	25	15	15	5	95	July 26.
13	Cheddar	May 27	Curd cut soft.	40	25	15	15	5	100	July 26.
14	Cheddar	May 27	Soft.	40	20	15	15	5	95	July 26.

Description of Commercial Qualities of Cheeses.

No. 7. Flavor, perfect; body, solid, firm and smooth; texture, fine and close.

No. 8. Flavor, perfect; body, solid and smooth, but less firm than above; texture, fine and close.

No. 9. Flavor, somewhat off; body, solid, firm and smooth; texture, fine and close.

No. 10. Flavor, not quite perfect, with a bare trace of taint; body, solid, firm and smooth; texture, fine and close.

No. 11. Flavor, perfect; body, solid, firm and smooth; texture, fine and close.

No. 12. Flavor, not quite perfect, slightly pungent; body, solid, firm and smooth; texture, fine and close.

No. 13. Flavor, perfect; body, solid, firm and smooth; texture, fine and close.

No. 14. Flavor, perfect; body, solid and smooth, but somewhat softer or less firm than in No. 13; texture, fine and close.

In color and appearance, the cheeses were alike, being all that could be desired in these respects.

TABULATED SUMMARY OF RESULTS.

NUMBER OF EXPERIMENTS.	Pounds of fat in 100 lbs. of milk.	Pounds of fat lost in whey for 100 lbs. of milk.	Per cent of fat in milk lost in whey.	Pounds of caseine and albumen in 100 lbs. of milk.	Pounds of caseine and albumen lost in whey for 100 lbs. of milk.	Per cent of caseine and albumen in milk lost in whey.	Pounds of caseine in 100 lbs. of milk.	Pounds of caseine lost in whey for 100 lbs. of milk.	Per cent of caseine in milk lost in whey.	Pounds of albumen in 100 lbs. of milk.	Pounds of albumen lost in whey for 100 lbs. of milk.	Per cent of albumen in milk lost in whey.	Pounds of caseine for one lb. of albumen in milk.	Pounds of fat for one lb. of caseine and albumen in milk.
Normal milk, 1, 3, 5.....	3.06	0.27	8.81	2.68	0.68	23.8	2.00	0.13	6.5	0.66	0.50	75.8	8.1	1.15
Normal milk, 2, 4, 6.....	3.84	0.31	9.28	2.65	0.65	24.4	2.00	0.14	7.0	0.66	0.51	77.3	8.1	1.26
Normal milk, 9, 11, 12.....	4.20	0.30	7.15	3.39	0.80	23.4	2.65	0.17	6.4	0.74	0.62	83.9	8.6	1.23
Normal milk, 10, 13, 14.....	4.30	0.29	6.74	3.50	0.82	23.4	2.70	0.14	6.2	0.80	0.68	85.0	8.4	1.28
Partially skimmed milk, 7.....	3.56	0.21	5.90	3.46	0.84	24.3	2.69	0.16	6.0	0.77	0.68	88.8	8.5	1.08
Whole milk and cream, 8.....	6.00	0.34	5.67	3.46	0.80	23.1	2.73	0.17	6.2	0.73	0.63	86.3	8.7	1.73
Average of factory experiments.....	3.20	0.29	9.06	2.65	0.64	24.1	2.00	0.13	6.5	0.66	0.51	77.3	8.1	1.21
Average of normal station experiments.....	4.25	0.29	6.95	3.45	0.81	23.5	2.77	0.16	5.8	0.77	0.65	84.4	8.5	1.23
Average of all station experiments.....	4.38	0.23	6.62	3.45	0.81	23.5	2.68	0.16	6.0	0.77	0.65	84.4	8.5	1.26
Average of all normal experiments.....	3.72	0.29	7.80	3.05	0.72	23.6	2.84	0.15	6.4	0.71	0.58	81.7	8.3	1.22
Average of all experiments.....	3.88	0.29	7.48	3.10	0.74	23.8	2.40	0.15	6.2	0.72	0.59	81.9	8.3	1.24

NUMBER OF EXPERIMENTS.												
	Pounds of fat in 100 lbs. of green cheese.	Pounds of caseine and albumen in 100 lbs. of green cheese.	Pounds of water in 100 lbs. of green cheese.	Pounds of fat in 100 lbs. of water free cheese.	Pounds of caseine and albumen in 100 lbs. of water free cheese.	Pounds of water free cheese.	Pounds of fat for 1 lb. of caseine and albumen in water free cheese.	Pounds of green cheese made from 100 lbs. of milk.	Pounds of water in cheese from 100 lbs. of milk.	Pounds of fat in cheese from 100 lbs. of milk.	Pounds of caseine and albumen in cheese from 100 lbs. of milk.	Pounds of cheese made for one lb. of fat in milk.
Normal milk, 3, 5,	33.1	23.9	37.5	53.0	33.0	2.7	1.40	8.54	3.30	3.30	2.09	2.79
Normal milk, 2, 4, 6,	34.9	23.3	36.7	53.1	33.1	2.7	1.30	8.95	3.30	3.30	2.09	2.69
Normal milk, 9, 11, 12,	36.1	23.0	34.4	55.1	33.4	2.7	1.51	11.06	3.30	3.30	2.64	2.65
Normal milk, 10, 13, 14,	36.6	23.8	34.9	56.3	36.3	2.7	1.54	11.30	3.35	3.35	2.66	2.66
Partially skid, mixed milk, 7,	31.3	23.1	36.5	50.1	41.1	2.7	1.22	10.40	3.70	3.70	2.66	2.65
Whole milk and cream, 8,	42.0	20.1	33.7	63.4	30.4	2.7	2.01	13.40	4.50	4.50	2.66	2.74
Average of factory experiments,	34.0	23.6	37.1	54.0	37.5	2.7	1.45	8.76	3.25	3.25	2.66	2.65
Average of	36.4	23.9	34.7	55.6	36.5	2.7	1.53	11.19	3.36	3.36	2.66	2.65
Average of	35.5	23.7	34.8	55.0	36.3	2.7	1.56	11.33	3.33	3.33	2.67	2.63
Average of	35.2	23.7	35.9	54.9	37.0	2.7	1.49	9.93	3.56	3.56	2.37	2.70
Average of	35.4	23.7	35.8	55.1	36.1	2.7	1.51	10.28	3.64	3.64	2.40	2.67
Pounds of milk required to make one lb. of cheese.	11.1	11.1	11.1	9.0	9.0	11.1	11.1	11.1	11.1	11.1	11.1	11.1
Pounds of loss in weight for 100 lbs. of cheese in four weeks.	7.70	6.42	6.67	6.60	7.03	6.06	7.03	6.06	7.03	6.06	7.03	6.06

SUMMARY OF RESULTS.

I. Loss of Milk-Constituents in Cheese-making.

1. *Fat.*

a. The amount of fat lost in the whey increased in some cases and decreased in others, when the amount of fat in the milk increased.

b. The average amount of fat lost in the whey in all the experiments was .29 pounds (about four and a half ounces) for 100 pounds of milk which was about 7.5 per cent of the fat in the milk. In the factory experiments the average loss of fat was about nine per cent of the fat in the milk; while, in the station experiments, the average loss was about seven per cent of the fat in the milk.

2. *Caseine and albumen.*

a. The amount of caseine and albumen lost in the whey increased quite uniformly when the caseine and albumen in the milk increased.

b. The average amount of caseine and albumen lost in the whey in all the experiments was 0.74 pounds (about twelve ounces) for 100 pounds of milk, averaging 0.64 pounds in the factory and 0.81 pounds in the station experiments. From 23.5 to twenty-four per cent of the caseine and albumen in the milk was lost, the proportion of loss being quite uniform in all the experiments.

c. Of the 0.74 pounds (or twelve ounces) of caseine and albumen lost, 0.15 pounds (about two and a half ounces) consisted of caseine and 0.59 pounds (about nine and a half ounces) of albumen. About six per cent of the caseine and eighty-two per cent of the albumen in the milk was lost, on an average.

d. In the various lots of milk used, there were, on an average, 2.4 pounds of caseine and 0.72 pounds of albumen, or, for every pound of albumen, there were about 3.3 pounds of caseine.

2. Influence of Composition of Milk on Composition of Cheese.

1. *Fat.*

a. The proportion of fat in the cheese increased, as a rule, when the amount of fat in the milk increased, but the increase of fat in the cheese was not uniform with the increase of fat in the milk. Green cheese, made from factory-milk, that contained about three pounds of fat in 100 pounds of milk, contained about thirty-three pounds of fat in 100 pounds of cheese. Cheese made from whole milk to which cream has been added, and which contained six pounds of fat in 100 pounds of cheese. Cheese made from milk containing about 3.35 pounds of fat in 100 pounds of milk contained about thirty-five pounds of fat in 100 pounds of cheese; when the milk contained about 4.25 pounds of fat in 100 pounds of milk, the cheese contained from thirty-six to 36.5 pounds of fat in 100 pounds of cheese. In case of milk, partially skimmed, containing 3.56 pounds of fat in 100 pounds of milk, the cheese contained nearly thirty-two pounds of fat in 100 pounds of cheese.

Basing a comparison of results upon the water-free cheese, instead of green cheese, we obtain results that are quite similar in their relations.

b. In general, the fat exercised a greater influence upon the composition of the cheese than any other constituent of the milk.

2. *Caseine and albumen.*

a. In the cheese made from the normal milk, the amount of caseine and albumen in 100 pounds of cheese was a fairly uniform quantity, varying in the green cheese from twenty-two to twenty-four pounds; and, in the water-free cheese, varying from thirty-six to thirty-eight pounds. The milks containing the least fat made cheese containing a little more caseine and albumen. Skimming the milk partially increased largely the amount of caseine and albumen in the cheese; while adding cream to whole milk diminished the amount of caseine and albumen in the cheese.

3. *Relation of fat to caseine and albumen in cheese as a basis for determining the character of milk.*

a. The results appear to indicate that in cheese, made from normal milk containing from three to 4.25 pounds of fat in 100 pounds of milk, there should be about 1.4 pounds to 1.5 of fat for one pound of caseine and albumen in the water-free cheese. Partial skimming reduced this ratio to 1.22 pounds, while addition of cream raised it to over two pounds.

3. **Influence of Composition of Milk on Yield of Cheese.**

1. *Fat.*

a. Of the increased yield of cheese obtained in the various experiments, nearly one-half of the increase, on an average, was due to an increase of fat in the milk from which the cheese was made.

b. The amount of fat retained in the cheese made from 100 pounds of milk increased when the amount of fat in the milk increased, but not with exact uniformity.

2. *Caseine and albumen.*

a. On an average, the increase of caseine and albumen in the milk produced a little over one-fifth of the increased yield of cheese observed in the various experiments.

b. The amount of caseine and albumen retained in the cheese made from 100 pounds of milk increased quite uniformly when the amount of caseine and albumen in the milk increased.

3. *Water.*

a. About one-third of the increased yield of cheese was due to an increased amount of water retained in the cheese.

b. The amount of water retained in the cheese made from 100 pounds of milk was quite variable, and increased when either fat or caseine and albumen in the milk increased.

4. **Yield of Cheese.**

1. **Pounds of cheese made from milk.**

a. Of the factory milk there were required, on an average, 11.4 pounds to make one pound of cheese.

b. Of the station milk 8.8 pounds sufficed to make one pound of cheese.

c. The low yield of cheese from the factory milk was mainly due to the small amount of fat, caseine and albumen contained in it, that is, to the poor quality of the milk; and, in addition, the loss in manufacture was a little greater. The poor quality of the milk was probably due to the fact that the cows were in the earlier stage of their period of lactation.

5. Influence of Variation of Conditions of Manufacture.

1. Variation in amount of rennet used.

a. Loss of milk constituents.—In two sets of comparisons, only one case showed any difference in loss of fat, caseine and albumen, and this was when the amount of rennet used was much less than the usual amount.

b. Yield.—No difference of yield was shown that could be attributed to variation in the amount of rennet used.

2. Cutting curd in hard and soft condition.

a. Loss of milk constituents.—In two sets of comparisons, one case of soft cutting gave a little larger loss of fat and caseine.

b. Yield.—In one case the soft-cut curd gave a little larger yield, owing mainly to the retention of more moisture.

6. Loss of Cheese in Weight During the First Month.

a. The loss of weight varied, for the first month, from 5.5 to 8.87 pounds, and averaged 6.95 pounds for each 100 pounds of green cheese.

CHEESE INVESTIGATION AND EXPERIMENTS FOR JUNE.

On account of convenience for reference, the experiments are numbered continuously from month to month during the season. The ten factory experiments for June are numbered from fifteen to twenty-four inclusive; the eight station experiments from twenty-

five to thirty-two inclusive. As before, the two sets of experiments will be discussed separately.

In addition to the variation of conditions of manufacture made in May, we have studied, in experiments 18 and 27, the effect of using a temperature considerably above 98 degrees F. for heating or "cooking" the curd. Also, in experiments 29 and 30, a comparison was made between normal milk and the same milk partially skimmed.

Analyses of Milk, Whey and Cheese—Composition Expressed in Parts Per Hundred.

	Per cent of water.	Per cent of total solids.	Per cent of fat.	Per cent of caseine and albumen.	Per cent of caseine.	Per cent of albumen.	Per cent of sugar, ash, etc.
No. 15—June 1, 1892:							
Milk	87.59	12.41	3.50	3.27	2.47	0.80	5.64
Whey	92.99	7.01	0.29	0.84	0.11	0.73	5.88
Green cheese	36.95	63.05	34.55	25.27	23.81	1.46	3.23
No. 16—June 1:							
Milk	87.44	12.56	3.60	3.26	2.41	0.85	5.70
Whey	92.96	7.04	0.29	0.85	0.09	0.76	5.90
Green cheese	35.27	64.73	34.35	26.10	24.37	1.73	4.28
No. 17—June 2:							
Milk	87.37	12.63	3.61	3.23	2.36	0.87	5.79
Whey	92.90	7.10	0.29	0.86	0.14	0.72	5.95
Green cheese	36.00	64.00	33.87	25.46	23.14	2.32	4.67
No. 18—June 2:							
Milk	87.54	12.46	3.52	3.26	2.41	0.85	5.68
Whey	93.05	6.95	0.38	0.86	0.13	0.73	5.71
Green cheese	36.22	63.78	33.14	26.09	24.23	1.86	4.55
No. 19—June 3:							
Milk	87.51	12.49	3.60	3.26	2.41	0.85	5.63
Whey	93.10	6.90	0.29	0.84	0.11	0.73	5.77
Green cheese	36.58	63.42	33.16	25.08	23.18	1.90	5.18

Analyses of Milk, Whey and Cheese—COMPOSITION EXPRESSED IN PARTS PER HUNDRED—(Continued).

	Per cent of water.	Per cent of total solids	P. r cent of fat.	Per cent of caseine and albumen.	Per cent of caseine	Per cent of albumen.	Per cent of sugar, ash, etc.
No. 20 — June 3:							
Milk	87.35	12.65	3.70	3.26	2.41	0.85	5.69
Whey	92.96	7.04	0.30	0.87	0.15	0.72	5.87
Green cheese	35.45	64.55	34.90	25.84	23.69	2.15	3.81
No. 21 — June 4:							
Milk	87.52	12.48	3.45	3.20	2.43	0.77	5.83
Whey	92.93	7.07	0.23	0.88	0.17	0.71	5.96
Green cheese	38.47	61.53	33.75	24.00	22.67	1.33	3.78
No. 22 — June 4:							
Milk	87.42	12.58	3.67	3.20	2.40	0.80	5.71
Whey	92.90	7.10	0.29	0.88	0.13	0.75	5.93
Green cheese	38.63	61.37	32.72	23.50	22.30	1.20	5.15
No. 23* — June 5:							
Milk	86.81	13.19	4.22	3.30	2.57	0.73	5.67
Whey	92.87	7.13	0.30	0.88	0.27	0.61	5.95
Green cheese	36.46	63.54	36.04	22.73	21.00	1.73	4.77
No. 24 + — June 5:							
Milk	88.25	11.75	2.95	3.26	2.50	0.70	5.54
Whey	93.18	6.82	0.29	0.88	0.12	0.76	5.65
Green cheese	38.16	61.84	30.05	26.41	25.65	0.76	5.38

No. 25 — June 27:									
Milk	86.74	13.26	4.00	3.23	2.60	0.63	6.03		
Whey	92.73	7.27	0.30	0.87	0.30	0.57	6.10		
Green cheese	39.66	60.34	33.48	22.30	21.20	1.10	4.56		
No. 26 — June 27:									
Milk	86.74	13.26	4.00	3.23	2.60	0.63	6.03		
Whey	92.67	7.33	0.32	0.88	0.32	0.56	6.13		
Green cheese	39.00	61.00	34.62	23.05	21.84	1.21	3.33		
No. 27 — June 28:									
Milk	87.59	12.41	3.90	3.14	2.45	0.69	5.37		
Whey	93.15	6.85	0.35	0.86	0.23	0.63	5.64		
Green cheese	33.67	66.33	36.25	24.51	23.30	1.21	5.57		
No. 28 — June 28:									
Milk	87.59	12.41	3.90	3.14	2.45	0.69	5.37		
Whey	93.25	6.75	0.29	0.84	0.23	0.61	5.62		
Green cheese	34.50	65.50	35.85	23.75	22.35	1.39	5.90		
No. 29 + — June 29:									
Milk	88.25	11.75	3.20	3.21	2.41	0.80	5.34		
Whey	93.20	6.80	0.29	0.85	0.05	0.80	5.66		
Green cheese	37.47	62.53	31.03	25.52	24.83	0.69	5.98		
No. 30 — June 29:									
Milk	87.40	12.60	4.10	3.18	2.44	0.74	5.32		
Whey	93.14	6.86	0.30	0.86	0.16	0.70	5.70		
Green cheese	35.80	64.20	36.20	23.24	22.29	0.95	4.76		

* Cream added.

+ Partially skimmed.

Analyses of Milk, Whey and Cheese—COMPOSITION EXPRESSED IN PARTS PER HUNDRED—(Concluded).

	Per cent of water.	Per cent of total solids.	Per cent of fat.	Per cent of caseine and albumen.	Per cent of caseine.	Per cent of albumen	Per cent of sugar, ash, etc.
No. 31 — June 30:							
Milk	87.39	12.61	3.95	3.20	2.47	0.73	5.46
Whey	93.07	6.93	0.28	0.86	0.12	0.74	5.79
Green cheese	37.42	62.58	35.17	23.00	22.42	0.58	4.41
No. 32 — June 30:							
Milk	87.39	12.61	3.95	3.20	2.47	0.73	5.46
Whey	93.10	6.90	0.28	0.86	0.16	0.70	5.76
Green cheese	36.34	63.66	35.35	24.38	23.31	1.07	3.93

Analyses of Milk, Whey and Cheese — From 100 POUNDS OF MILK.

	Pounds.	Pounds of water.	Pounds of total solids.	Pounds of fat.	Pounds of caseine and albumen.	Pounds of caseine.	Pounds of albumen.	Pounds of sugar, ash, etc.
No. 15 — June 1:								
Milk	100	87.59	12.41	3.50	3.27	2.47	0.80	5.64
Whey	90.26	83.94	6.32	0.26	0.76	0.10	0.66	5.30
Cheese	9.74	3.60	6.14	3.36	2.46	2.32	0.14	0.32
No. 16 — June 1:								
Milk	100	87.44	12.56	3.60	3.26	2.41	0.85	5.70
Whey	90.10	83.76	6.34	0.26	0.77	0.09	0.68	5.31
Cheese	9.90	3.49	6.41	3.40	2.58	2.41	0.17	0.42
No. 17 — June 2:								
Milk	100	87.37	12.63	3.61	3.23	2.36	0.87	5.79
Whey	90.10	83.70	6.40	0.26	0.77	0.13	0.64	5.37
Cheese	9.90	3.56	6.34	3.35	2.52	2.29	0.23	0.47
No. 18 — June 2:								
Milk	100	87.54	12.46	3.52	3.26	2.41	0.85	5.68
Whey	90.33	84.05	6.28	0.34	0.78	0.11	0.67	5.16
Cheese	9.67	3.50	6.17	3.20	2.52	2.34	0.18	0.45
No. 19 — June 3:								
Milk	100	87.51	12.49	3.60	3.26	2.41	0.85	5.63
Whey	89.98	83.77	6.21	0.26	0.76	0.10	0.66	5.19
Cheese	10.02	3.67	6.35	3.34	2.51	2.32	0.19	0.52

Analyses of Milk, Whey and Cheese — FROM 100 POUNDS OF MILK — (Continued).

	Pounds.	Pounds of water	Pounds of total solids.	Pounds of fat.	Pounds of caseine and albumen.	Pounds of caseine	Pounds of albumen.	Pounds of sugar, ash, etc.
No. 20 — June 3:								
Milk	100	87.35	12.65	3.70	3.26	2.41	0.85	5.69
Whey	90.35	84.00	6.35	0.27	0.79	0.14	0.65	5.29
Cheese	9.65	3.42	6.23	3.37	2.49	2.29	0.20	0.37
No. 21 — June 4:								
Milk	100	87.52	12.48	3.45	3.20	2.43	0.77	5.83
Whey	90.32	83.93	6.39	0.21	0.79	0.15	0.64	5.39
Cheese	9.68	3.72	5.96	3.27	2.32	2.19	0.13	0.37
No. 22 — June 4:								
Milk	100	87.42	12.58	3.67	3.20	2.40	0.80	5.71
Whey	89.62	3.26	6.36	0.36	0.79	0.12	0.67	5.31
Cheese	10.38	4.01	6.37	3.40	2.44	2.31	0.13	0.53
No. 23* — June 5:								
Milk	100	86.81	13.19	4.22	3.30	2.57	0.73	5.67
Whey	88.90	82.56	6.34	0.27	0.78	0.24	0.54	5.29
Cheese	11.10	4.05	7.05	4.00	2.52	2.33	0.19	0.53
No. 24† — June 5:								
Milk	100	88.25	11.75	2.95	3.26	2.50	0.76	5.54
Whey	90.90	84.70	6.20	0.26	0.80	0.11	0.69	5.14
Cheese	9.10	3.47	5.63	2.73	2.40	2.33	0.07	0.50

No. 25 — June 27:								
Milk	100	86.74	13.26	4.00	3.23	2.60	0.63	6.03
Whey	88.98	82.52	6.46	0.27	0.77	0.26	0.51	5.42
Cheese	11.02	4.37	6.65	3.69	2.46	2.34	0.12	0.50
No. 26 — June 27:								
Milk	100	86.74	13.26	4.00	3.23	2.60	0.63	6.03
Whey	89.10	82.57	6.53	0.29	0.79	0.29	0.50	5.45
Cheese	10.90	4.25	6.65	3.77	2.51	2.38	0.13	0.37
No. 27 — June 28:								
Milk	100	87.59	12.41	3.90	3.14	2.45	0.69	5.37
Whey	90.18	84.00	6.18	0.32	0.78	0.21	0.57	5.08
Cheese	9.82	3.31	6.51	3.56	2.41	2.29	0.12	0.54
No. 28 — June 28:								
Milk	100	87.59	12.41	3.90	3.14	2.45	0.69	5.37
Whey	90.02	83.94	6.08	0.26	0.76	0.21	0.55	5.06
Cheese	9.98	3.44	6.54	3.58	2.37	2.23	0.14	0.59
No. 29* — June 29:								
Milk	100	88.25	11.75	3.20	3.21	2.41	0.80	5.34
Whey	90.59	84.43	6.16	0.26	0.77	0.04	0.73	5.13
Cheese	9.41	3.53	5.88	2.92	2.40	2.33	0.07	0.56
No. 30 — June 29:								
Milk	100	87.40	12.60	4.10	3.18	2.44	0.74	5.32
Whey	89.70	83.55	6.15	0.27	0.77	0.13	0.64	5.11
Cheese	10.30	3.69	6.61	3.73	2.39	2.29	0.10	0.49

*** Cream added.**

+ Partially skimmed.

Analyses of Milk, Whey and Cheese — FROM 100 POUNDS OF MILK — (Concluded).

	Pounds.	Pounds of water.	Pounds of total solids	Pounds of fat.	Pounds of caseine and albumen.	Pounds of caseine.	Pounds of albumen.	Pounds of sugar, ash, etc.
No. 31 — June 30:								
Milk	100	87.39	12.61	3.95	3.20	2.47	0.73	5.46
Whey	89.60	83.39	6.21	0.25	0.77	0.10	0.67	5.19
Cheese	10.40	3.89	6.51	3.66	2.39	2.33	0.06	0.46
No. 32 — June 30:								
Milk	100	87.39	12.61	3.95	3.20	2.47	0.73	5.46
Whey.	89.70	83.51	6.19	0.25	0.77	0.15	0.62	5.17
Cheese	10.30	3.74	6.56	3.64	2.51	2.40	0.11	0.41

TABULATED STATEMENT OF THE PRINCIPAL CONDITIONS OF MANUFACTURE.

NUMBER OF EXPERIMENT.	Date.	Kind of cheese made.	Pounds of milk used.	Pounds of green cheese made.	Temperature of milk when rennet was added.	Ounce of rennet extract used per 1,000 pounds of milk.	Time required for milk to begin to thicken.	Time from adding rennet to cutting curd.	Condition of curd when cut.	Temperature to which curd was heated after cutting.	Time taken to heat to 98° F. or more	Time from reaching required temperature to drawing whey.	Time from drawing whey to salting.	Ounce of salt used for each pound of fat in milk.	Time from salting to putting in press.	Time of whole operation.
					Deg.	Ozs.	Min.	Min.		Deg.	Min.	Min.	Min.	Oz.	Min.	Hrs. Min.
15	1892. June 1	Cheddar	4,418	430.50	84	2	16	40	Hard	98	70	40	125	1.13	55	6 40
16	June 1	Cheddar	4,421	437.75	84	2	17	30	Soft	98	75	75	180	1.11	45	7 15
17	June 2	Cheddar	4,394	434.75	84	2	17	30	Ordinary	100	50	65	200	1.11	30	6 50
18	June 2	Cheddar	4,633	448.00	84	2	23	37	Ordinary	106	65	95	200	1.13	25	7 40
19	June 3	Cheddar	4,559	457.00	84	2	10	15	Ordinary	98	82	90	200	1.11	30	7 25
20	June 3	Stirred-curd	4,513	435.50	84	2	13	33	Ordinary	98	67	175	25	1.29	25	7 45
21	June 4	Cheddar	4,510	436.25	86	2	9	15	Ordinary	98	65	105	80	1.16	30	7 05
22	June 4	Cheddar	4,537	471.00	84	2	9	15	Ordinary	98	65	50	145	1.09	25	7 30
23	June 5	Cheddar	4,640	512.50	84	2	11	20	Ordinary	98	55	115	205	0.95	25	7 07
24	June 5	Cheddar	4,433	403.25	84	2	20	30	Ordinary	97	80	100	150	1.35	50	8 35
25	June 27	Cheddar	250	27.60	84	3	8	20	Ordinary	100	62	24	67	1.20	35	4 15
26	June 27	Cheddar	250	27.30	84	3	8	11	Hard	100	43	42	75	1.20	35	4 15
27	June 28	Cheddar	250	24.60	86	3	11	15	Soft	106	58	82	146	1.23	20	5 05
28	June 28	Cheddar	250	24.95	86	3	11	15	Ordinary	100	43	40	142	1.23	20	5 05
29	June 29	Cheddar	240.5	22.60	86	2.5	12	18	Ordinary	97	47	45	185	1.06	15	6 10
30	June 29	Cheddar	250	25.75	84	3	12	16	Ordinary	98	50	40	160	1.17	15	6 10
31	June 30	Stirred-curd	250	26.00	84	3	15	22	Ordinary	98	43	100	15	1.22	100	6 40
32	June 30	Cheddar	250	25.75	84	3	15	25	Ordinary	98	43	62	183	1.32	10	6 25

Statement of Results.

1. Time required for milk to begin to thicken after addition of rennet.

a. Factory experiments.—The time varied from nine to twenty-three minutes and averaged about fifteen minutes.

b. Station experiments.—The time varied from eight to fifteen minutes and averaged about twelve minutes.

2. Time from adding rennet to cutting curd.

a. Factory experiments.—The time varied from fifteen to forty minutes and averaged about twenty-six minutes.

b. Station experiments.—The time varied from eleven to twenty-five minutes and averaged eighteen minutes.

3. Time required to heat to 98 degrees F., or more, after cutting and stirring curd.

a. Factory experiments.—The time varied from fifty to eighty-two minutes and averaged about sixty-seven minutes.

b. Station experiments.—The time varied from forty-three to sixty-two minutes and averaged about forty-nine minutes.

4. Time from reaching 98 degrees F., or more, to drawing whey.

a. Factory experiments.—The time varied from fifty to 175 minutes and averaged ninety-one minutes.

b. Station experiments.—The time varied from twenty-four to 100 minutes and averaged fifty-four minutes.

5. Time from drawing whey to salting curd.

a. Factory experiments.—The time varied from 125 to 205 minutes in the Cheddar process, averaging 170 minutes; in the stirred-curd process, the time was twenty-five minutes.

b. Station experiments.—The time varied from sixty-seven to 150 minutes and averaged 121 minutes in the Cheddar process; in the stirred-curd process, the time was fifteen minutes.

6. Time occupied by the whole operation of cheese-making.

a. Factory experiments.—The time varied from six hours and forty minutes to over nine hours and averaged about seven hours and forty-five minutes.

b. Station experiments.—The time varied from four hours and fifteen minutes to five hours and forty minutes and averaged about five hours.

For explanation of data in the various tables following, see "Cheese Investigations and Experiments for May," in this report.

LOSS OF MILK-CONSTITUENTS IN CHEESE-MAKING.

Amount of fat recovered and lost in cheese-making.

TABLE SHOWING AMOUNT OF FAT RECOVERED AND LOST IN CHEESE-MAKING.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of fat lost in whey for 100 lbs. of milk.	Pounds of fat recovered in cheese for 100 lbs. of milk.	Per cent of fat in milk lost in whey.	Per cent of fat in milk recovered in cheese.
24*	2.95	0.26	2.69	8.81	91.19
21	3.45	0.21	3.24	6.09	93.91
15	3.50	0.26	3.24	7.43	92.57
18	3.52	0.34	3.18	9.66	90.34
16	3.60	0.26	3.34	7.22	92.78
19	3.60	0.26	3.34	7.22	92.78
17	3.61	0.26	3.35	7.20	92.80
22	3.67	0.26	3.41	7.08	92.92
20	3.70	0.27	3.43	7.30	92.70
23†	4.22	0.27	3.95	6.40	93.60
29*	3.20	0.26	2.94	8.12	91.88
27	3.90	0.32	3.58	8.20	91.80
28	3.90	0.26	3.64	6.67	93.33
31	3.95	0.25	3.70	6.33	93.67
32	3.95	0.25	3.70	6.33	93.67
25	4.00	0.27	3.73	6.75	93.25
26	4.00	0.29	3.71	7.25	92.75
30	4.10	0.27	3.83	6.60	93.40

Statement of Results.

1. Pounds of fat in 100 pounds of milk.

a. Factory experiments.—The milk-fat varied from 2.95 to 4.22 pounds in 100 pounds of milk, and averaged 3.58 pounds, nearly 0.40 pounds more than in May.

b. Station experiments.—The milk-fat varied from 3.20 to 4.10 pounds in 100 pounds of milk, and averaged 3.88 pounds, considerably less than in May. This was due to the fact that a portion of

the milk was obtained outside of the station-herd, and this was of poorer quality.

2. Pounds of fat lost for 100 pounds of milk.

a. Factory experiments.—The amount of fat lost in the whey varied from 0.21 to 0.34 pounds for each hundred pounds of milk, and averaged nearly 0.27 pounds.

b. Station experiments.—The amount of fat lost in the whey varied from 0.25 to 0.32 pounds for each hundred pounds of milk, and averaged 0.27 pounds.

As noticed in connection with the May experiments, the loss of fat is more or less independent of the amount of fat in the milk, when the conditions of manufacture are fairly uniform. The loss in June is slightly less than in May, being 0.27 pounds in June as against 0.29 pounds in May.

3. Per cent of fat in milk lost in whey.

a. Factory experiments.—The per cent of milk fat that was lost varied from 6.09 to 9.66 per cent and averaged 7.54 per cent of the fat in the milk.

b. Station experiments.—The per cent of milk fat lost varied from 6.33 to 8.20 per cent and averaged 6.96 per cent of the fat in the milk.

4. Comparison of stirred-curd and Cheddar' processes with reference to loss of fat.

a. Factory experiments.—In experiment 19 the Cheddar process was employed, and in experiment 20, made the same day, the stirred-curd process was used. The loss of fat was practically the same in both cases.

b. Station experiments.—In experiment 31 the stirred-curd process was used; in 32, the Cheddar process. The results were identical as to loss of fat.

5. Influence of cutting curd in hard and soft condition upon loss of fat.

a. Factory experiments.—In experiment 15 the curd was cut hard; in experiment 16 it was cut soft. The proportion of fat lost was a trifle greater in case of the hard cutting, being as 7.43 to 7.22 per cent of the fat in the milk.

b. Station experiments.—In experiment 25 the curd was cut hard, in 26 soft. The loss was noticeably but not seriously greater in case of the soft-cut curd, being as 7.25 to 6.75 per cent of the fat in the milk.

In the two sets of experiments made in May, the loss was a little greater in case of the soft-cut curd.

6. Influence of using different amounts of rennet upon loss of fat.

a. Factory experiments.—In experiment 21, two ounces of rennet extract were used for 1,000 pounds of milk; in 22, four ounces were used. The loss was greater in case of the larger amount of rennet used, being as 7.08 to 6.09 per cent of the fat in the milk. The difference of loss was, doubtless, due to difference in composition and quality of milk rather than to difference in amount of rennet used.

7. Influence of heating curd at a temperature higher than 100 degrees F. upon the loss of fat.

a. Factory experiments.—In experiment 18 the curd was heated to 106 degrees F., and the loss of fat was .34 pounds of fat for 100 pounds of milk, or 9.66 per cent of the fat in the milk, considerably the greatest loss in any of the June experiments.

b. Station experiments.—In experiment 27 the curd was heated to 106 degrees F., and the loss of fat was 0.32 pounds of fat for 100 pounds of milk, or 8.20 per cent of the fat in the milk, which is greater than in any other June experiment made at the station.

Both experiments indicate a decided loss of fat when the higher temperature was used. It is not an uncommon occurrence to find cheesemakers, especially in the cold days of spring and fall, employing heat considerably above 100 degrees F. to heat the curd. The practice of using a higher degree of heat than usual seems to be based upon the belief that, in cold weather, a higher temperature is necessary to secure good results. That such belief is mistaken is readily shown on general principles, since no desirable result is secured at the higher temperature that could not be obtained at the temperature ordinarily used.

The foregoing experiments show that the practice, besides being useless, is attended with more or less serious loss.

8. Influence of skimming milk upon loss of fat.

a. Factory experiments.—In experiments 23 and 24 some fat was taken from the milk used in 24 and added to that used in 23, so that 24 contained 2.95 pounds of fat in 100 pounds of milk, and 23 contained 4.22 pounds of fat. The amount of fat lost for 100 pounds of milk was about the same, being 0.26 pounds in case of the skim-milk and 0.27 in case of the richer milk; but the per cent of the fat in the milk that was lost was 8.81 in case of the skim-milk and 6.40 in case of the richer milk.

b. Station experiments.—In experiment 30, normal milk containing 4.10 pounds of fat for 100 pounds of milk was used. In experiment 29, milk which was originally the same as that used in 30, but from which nearly one-fourth of its fat had been removed, was used. The method employed in removing the fat was to run one-fourth of the milk through a De Laval Baby Separator No. 2, and to add the skim-milk thus obtained to the remaining three-fourths of whole milk. By this treatment the fat in the milk used in experiment 29 was lowered from 4.10 to 3.20 pounds for 100 pounds of milk.

In the skim-milk the loss of fat was 0.26 pounds; in the whole milk, 0.27 pounds. The proportion of loss in the skim-milk was 8.12 per cent of the fat in the milk, while in the whole-milk it was 6.60 per cent.

These two sets of experiments indicate that, while the amount of fat lost for 100 pounds of milk is nearly the same in milk, skimmed or whole, yet the proportion of fat lost is greater in the skim-milk, and the whole-milk works more economically as regards loss of fat. During the coming months, we plan to continue experiments in this line and make the investigation as exhaustive as circumstances will permit us.

9. General summary.

Grouping together the different experiments in which milks of

similar composition were used and averaging the results, we obtain the following table:

NUMBER OF EXPERIMENT.	Pounds of fat in 100 pounds of milk.	Pounds of fat lost in whey for 100 pounds of milk.	Pounds of fat recovered in cheese for 100 pounds of milk.	Per cent of fat in milk lost in whey.	Per cent of fat in milk recov- ered in cheese.
24*	2.95	0.26	2.69	8.81	91.19
29*	3.20	0.26	2.94	8.12	91.88
21	3.45	0.21	3.24	6.09	93.91
15	3.50	0.26	3.24	7.43	92.57
16, 17, 19.....	3.60	0.26	3.34	7.22	92.78
20, 22.....	3.70	0.27	3.43	7.30	92.70
28	3.90	0.26	3.64	6.67	93.33
31, 32.....	3.95	0.25	3.70	6.33	93.67
25, 26.....	4.00	0.28	3.72	7.00	93.00
30	4.10	0.27	3.83	6.60	93.40
23+	4.20	0.27	3.95	6.40	93.60

Taking all the milk used in the eighteen June experiments, the average amount of fat in 100 pounds of milk was 3.71 pounds; of this fat, about 0.27 pounds (a little over four ounces) or 7.28 per cent of the fat in the milk were lost in the whey for each 100 pounds of milk, while 3.44 pounds of fat were recovered in the cheese. The difference in the loss of fat between the highest and lowest amounts was about two ounces of fat for each 100 pounds of milk. The amount of fat lost was the same whether the Cheddar or stirred-curd process was employed. The effect of cutting curd in hard and soft condition upon loss of fat did not appear to be uniform. The use of different amounts of rennet apparently had no influence upon amount of fat lost.

Heating curd to 106 degrees F. caused an appreciable loss in each instance.

While skimming milk appeared to diminish very slightly the amount of fat lost in whey for 100 pounds of milk, still the proportion of fat in milk that was lost in the whey was in each case greater in the skim-milk than in the whole milk.

* Partially skimmed.

+ Cream added.

TABLE SHOWING AMOUNT OF CASEINE AND ALBUMEN RECOVERED AND LOST IN CHEESE-MAKING.

NUMBER OF EXPERIMENT.	Pounds of caseine and albumen in 100 pounds of milk.	Pounds of caseine and albumen lost in whey for 100 pounds of milk.	Pounds of caseine and albumen recovered in cheese for 100 pounds of milk.	Per cent of caseine and al- bumen in milk lost in whey.	Per cent of caseine and al- bumen in milk recovered in cheese.
24	3.26	0.80	2.46	24.54	75.46
21	3.20	0.79	2.41	24.69	75.31
15	3.27	0.76	2.51	23.24	76.76
18	3.26	0.78	2.48	23.92	76.08
16	2.26	0.77	2.49	23.62	76.38
19	3.26	0.76	2.50	23.31	76.69
17	3.23	0.77	2.46	23.84	76.16
22	3.20	0.79	2.41	24.69	75.31
20	3.26	0.79	2.47	24.23	75.77
23	3.30	0.78	2.52	23.64	76.36
29	3.21	0.77	2.44	24.00	76.00
27	3.14	0.78	2.36	24.84	75.16
28	3.14	0.76	2.38	24.20	75.80
31	3.20	0.77	2.43	24.06	75.94
32	3.20	0.77	2.43	24.06	75.94
25	3.23	0.77	2.46	23.84	76.16
26	3.23	0.79	2.44	24.46	75.54
30	3.18	0.77	2.41	24.21	75.79

Statement of Results.

1. Pounds of caseine and albumen in 100 pounds of milk.

a. Factory experiments.—The amount of caseine and albumen in the milk varied from 3.20 to 3.30 pounds in 100 pounds of milk, and averaged 3.25 pounds.

b. Station experiments.—The amount of caseine and albumen varied from 3.14 to 3.23 pounds in 100 pounds of milk, and averaged 3.19 pounds.

2. Pounds of caseine and albumen lost in whey for 100 pounds of milk.

a. Factory experiments.—The amount of caseine and albumen lost in the whey varied from 0.76 to 0.80 pounds for each hundred pounds of milk, and averaged 0.78 pounds.

b. Station experiments.—The amount of caseine and albumen lost in the whey varied from 0.76 to 0.79 pounds, and averaged 0.77 for 100 pounds of milk.

3. Per cent of caseine and albumen in milk lost in whey.

a. Factory experiments.—The per cent of caseine and albumen that was lost in the whey varied from 23.31 to 24.69 per cent of the caseine and albumen in the milk, and averaged about 24 per cent.

b. Station experiments.—The per cent of caseine and albumen lost in the whey varied from 23.84 to 24.84 per cent of the caseine and albumen in the milk, and averaged 24.14 per cent.

4. Variations of conditions of manufacture, such as using Cheddar and stirred-curd processes, varying the amount of rennet, employing higher temperature for heating curd, cutting curd soft and hard, and skimming milk, appeared to influence very little, if at all, the amounts of caseine and albumen lost in the whey.

General Summary.

Taking all the June experiments, the amount of caseine and albumen averaged 3.22 pounds in 100 pounds of milk; of this amount nearly 0.78 pounds (about 12 1-2 ounces), or 24.10 per cent of the caseine and albumen in the milk, were lost in the whey for each 100 pounds of milk, while 2.44 pounds were recovered in the cheese. From both the May and June experiments it would appear as if the proportion of caseine and albumen lost were quite uniform, being about twenty-four per cent of the amount present in the milk, and this loss is not much influenced by variation of conditions of manufacture, so far as we have yet experimented.

TABLE SHOWING RELATION OF CASEINE TO ALBUMEN IN MILK.

NUMBER OF EXPERIMENT.	Pounds of caseine and albumen in 100 lbs. of milk.	Pounds of caseine in 100 lbs. of milk.	Pounds of albumen in 100 lbs. of milk.	Pounds of caseine for 100 lbs. of caseine and albumen together.	Pounds of albumen for 100 lbs. of caseine and albumen together.	Pounds of caseine for one pound of albumen in milk.
24.....	3.26	2.50	0.76	76.70	23.30	3.3
21.....	3.20	2.43	0.77	75.94	24.06	3.2
15.....	3.27	2.47	0.80	75.54	24.46	3.1
18.....	3.26	2.41	0.85	73.92	26.08	2.8
16.....	3.26	2.41	0.85	73.92	26.08	2.8
19.....	3.26	2.41	0.85	73.92	26.08	2.8
17.....	3.23	2.36	0.87	73.07	26.93	2.7
22.....	3.20	2.40	0.80	75.00	25.00	3.0
20.....	2.26	2.41	0.85	73.92	26.08	2.8
23.....	3.30	2.57	0.73	77.88	22.12	3.5
29.....	3.21	2.41	0.80	75.08	24.92	3.0
27.....	3.14	2.45	0.69	78.00	22.00	3.6
28.....	3.14	2.45	0.69	78.00	22.00	3.6
31.....	3.20	2.47	0.73	77.20	22.80	3.4
32.....	3.20	2.47	0.73	77.20	22.80	3.4
2.....	3.23	2.60	0.63	80.50	19.50	4.1
26.....	3.23	2.60	0.63	80.50	19.50	4.1
30.....	3.18	2.44	0.74	76.70	23.30	3.3

Statement of Results.

1. Pounds of caseine and albumen in 100 pounds of milk.

a. Factory experiments.—The amount of caseine and albumen averaged 3.25 pounds.

b. Station experiments.—The amount of caseine and albumen averaged 3.19 pounds.

2. Pounds of caseine in 100 pounds of milk.

a. Factory experiments.—The caseine varied from 2.36 to 2.57 pounds, and averaged 2.44 pounds in 100 pounds of milk.

b. Station experiments.—The caseine varied from 2.41 to 2.60 pounds, and averaged 2.48 pounds in 100 pounds of milk.

3. Pounds of albumen in 100 pounds of milk.

a. Factory experiments.—The amount of albumen varied from 0.73 to 0.87 pounds, and averaged 0.81 pounds in 100 pounds of milk.

b. Station experiments.—The albumen varied from 0.63 to 0.80 pounds, and averaged about 0.70 pounds in 100 pounds of milk.

4. Pounds of caseine for one pound of albumen in milk.

a. Factory experiments.—For each pound of albumen in the milk the caseine varied from 2.7 to 3.5 pounds, and averaged three pounds.

b. Station experiments.—For each pound of albumen in the milk, the caseine varied from 3 to 4.1 pounds, and averaged nearly 3.6 pounds.

5. General summary.

In all the June experiments the average of caseine and albumen was 3.23 pounds in 100 pounds of milk; of this amount, about 2.46 pounds, or 76.40 per cent, consisted of caseine, while 0.76 pounds, or 23.60 per cent, consisted of albumen. There was, on an average, 3.24 pounds of caseine to one pound of albumen.

INFLUENCE OF COMPOSITION OF MILK ON COMPOSITION OF CHEESE.

Influence of Fat in Milk on Composition of Cheese.

TABLE SHOWING RELATION OF FAT IN MILK TO FAT IN CHEESE.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of fat in 100 lbs. of water-free cheese.	Pounds of fat in 100lbs of water- free cheese for one lb. of fat in milk.
24*	2.95	48.6	16.5
21	3.45	54.9	16.0
15	3.50	54.8	15.7
18	3.52	52.0	14.8
16	3.60	53.1	14.8
19	3.60	52.3	14.5
17	3.61	52.9	14.6
22	3.67	53.3	14.5
20	3.70	54.1	14.6
23†	4.22	56.7	13.4
29*	3.20	49.6	15.5
27	3.90	54.7	14.0
28	3.90	54.8	14.0
31	3.95	56.2	14.2
32	3.95	55.5	14.1
25	4.00	56.5	13.9
26	4.00	56.7	14.2
30	4.10	56.4	13.8

Statement of Results.

1. Amount of fat in 100 pounds of milk.

a. Factory experiments.—The fat varied from 2.75 to 4.22 pounds and averaged 3.58 pounds in 100 pounds of milk.

* Partially skimmed. † Cream added.

b. Station experiments.—The fat varied from 3.20 to 4.10 pounds and averaged 3.88 pounds in 100 pounds of milk.

2. Amount of fat in 100 pounds of water-free cheese.

a. Factory experiments.—The fat varied from 48.6 to 56.7 pounds and averaged 53.3 pounds in 100 pounds of water-free cheese.

b. Station experiments.—The fat varied from 49.6 to 56.7 pounds, and averaged 54.9 pounds in 100 pounds of water-free cheese.

3. Pounds of fat in 100 pounds of cheese for one pound of fat in milk.

a. Factory experiments.—For each pound of fat in milk there were in 100 pounds of cheese from 13.4 to 16.5 pounds of fat with an average of 14.9 pounds.

b. Station experiments.—For each pound of fat in milk there were in 100 pounds of cheese from 13.8 to 15.5 pounds of fat, with an average of 14.2 pounds.

4. So far as the May and June data go, we are justified in saying that water-free cheese containing less than 50 per cent of fat is made from milk that has been skimmed.

5. Grouping the results of the various experiments and averaging each group, we can tabulate the results as follows:

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of fat in 100 lbs. of water- free cheese.	Pounds of fat in 100 lbs. of water- free cheese for one lb. of fat in milk.
24*.....	2.95	48.6	16.5
29*.....	3.20	49.6	15.5
15, 18, 21.....	3.50	53.9	15.4
16, 17, 19.....	3.60	52.8	14.7
20, 22.....	3.70	53.7	14.5
27, 28.....	3.90	54.7	14.0
31, 32.....	3.95	55.9	14.1
25, 26.....	4.00	56.1	14.0
30.....	4.10	56.4	13.8
23†....	4.22	56.7	13.4

* Partially skimmed.

† Cream added.

The tendency to an increase of fat in the cheese with an increase of fat in the milk is very marked. It is also noticeable that the proportion of fat in cheese does not increase uniformly with the increase of fat in the milk, and, since the increase of fat in the milk is not followed by a proportional increase of per cent of fat in the cheese, the ratio of the two sets of numbers gradually diminishes as the fat in the milk increases, which is clearly shown in the last column of the above table.

Influence of Caseine and Albumen in Milk on Composition of Cheese.

TABLE SHOWING RELATION OF CASEINE AND ALBUMEN IN MILK TO CASEINE AND ALBUMEN IN CHEESE.

NUMBER OF EXPERIMENT.	Pounds of case- ine and albumen in 100 lbs. of milk	Pounds of case- ine and albumen in 100 lbs. of water-free cheese.	Ratio of caseine and albumen in milk to caseine and albumen in cheese.
24*	3.26	42.7	13.1
21	3.20	39.1	12.2
15	3.27	40.1	12.3
18	3.26	40.9	12.5
16	3.26	40.3	12.4
1	3.26	39.6	12.2
17	3.23	39.8	12.3
22	3.20	38.3	12.0
20	3.26	40.0	12.3
23†	3.30	35.8	10.9
29*	3.21	40.8	12.7
27	3.14	37.0	11.8
28	3.14	36.3	11.6
31	3.20	36.8	11.5
32	3.20	38.3	12.0
25	3.23	37.0	11.5
26	3.28	37.8	11.7
30	3.13	36.2	11.5

Statement of Results.

1. Pounds of caseine and albumen in 100 pounds of milk.

a. Factory experiments.—The amount of caseine and albumen varied from 3.20 to 3.30 pounds, and averaged 3.25 pounds in 100 pounds of milk.

* Partially skimmed. † Cream added.

b. Station experiments.—The amount of caseine and albumen varied from 3.14 to 3.23 pounds, and averaged 3.19 pounds.

2. Pounds of caseine and albumen in 100 pounds of water-free cheese.

a. Factory experiments.—The amount of caseine and albumen varied from 35.8 to 42.7 pounds in 100 pounds of water-free cheese, and averaged 39.7 pounds.

b. Station experiments.—The amount of caseine and albumen in 100 pounds of water-free cheese varied from 36.2 to 40.8 pounds, and averaged 37.5 pounds.

3. Effect of skimming milk and adding cream to milk upon the proportion of caseine and albumen in cheese.

While skimming milk does not cause any marked changes in the per cent of caseine and albumen in the milk, it does cause a marked difference in the amount of caseine and albumen relative to the fat, and, therefore, produces a change in the composition of the cheese. In experiment 24 the milk was partially skimmed, and the amount of caseine and albumen in the cheese was highest in all the factory experiments; while in experiment 23 some fat was added to the milk, and the cheese contained the smallest per cent of caseine and albumen. In experiment 29 the milk was nearly one-fourth skimmed, and the amount of caseine and albumen in the cheese was highest of all the station experiments.

4. Pounds of caseine and albumen in 100 pounds of cheese for one pound of caseine and albumen in milk.

a. Factory experiments.—The ratio varied from 10.9 to 13.1, and averaged 12.2. Taking only the normal milks, the variation was from 12 to 12.5.

b. Station experiments.—The ratio varied 11.4 to 12 for normal milks, or from 11.4 to 12.7 for all, and averaged 11.8.

5. General summary.

Grouping and averaging the results for milks containing about the same amount of caseine and albumen, we have the following:

NUMBER OF EXPERIMENT.	Pounds of caseine and albumen in 100 lbs of milk.	Pounds of caseine and albumen in 100 lbs. of water-free cheese.	Pounds of caseine and albumen in 100 lbs. of cheese for 1 lb. of caseine and albumen in milk.
27, 28, 30	3.15	36.5	11.6
21, 22, 31, 32.....	3.20	38.1	11.9
15, 18, 16, 19, 17, 20, 25, 26.	3.25	39.4	12.1
24*	3.26	42.7	13.1
23†.....	3.30	35.8	10.9
29*	3.21	40.8	12.7

Influence of Relation of Fat to Caseine and Albumen in Milk on Composition of Cheese.

TABLE SHOWING RELATION OF FAT TO CASEINE AND ALBUMEN IN MILK AND INFLUENCE OF RELATION ON COMPOSITION OF CHEESE.

NUMBER OF EXPERIMENT.	Pounds of fat for 1 pound of caseine and albumen in milk.	Pounds of fat in 100 lbs. of water-free cheese.	Pounds of caseine and albumen in 100 lbs. of water-free cheese.
24*	0.90	48.6	42.7
21..	1.08	54.9	39.1
15.....	1.07	54.8	40.1
18.....	1.08	52.0	40.9
16.	1.10	53.1	40.3
19.....	1.10	52.3	39.6
17.....	1.12	52.9	39.8
22.....	1.15	53.3	38.3
20.....	1.14	54.1	40.0
23†.....	1.28	56.7	35.8
29*	1.00	49.6	40.8
27.....	1.24	54.7	37.0
28.....	1.24	54.8	36.3
31.....	1.23	56.2	36.8
32.....	1.23	55.5	38.3
25.	1.24	55.5	37.0
26.....	1.24	56.7	37.8
30.....	1.29	56.4	36.2

* Partially skimmed. † Cream added.

Statement of Results.

1. Pounds of fat for one pound of caseine and albumen in milk.

a. Factory experiments.—In the normal milks there were from 1.07 to 1.15 pounds of fat for each pound of caseine and albumen in the milk, with an average of 1.10. Skimming reduced the amount to 0.90; that is, there was a larger amount of caseine and albumen than there was of fat; while adding cream raised the amount to 1.28 pounds of fat for each pound of caseine and albumen in the milk.

b. Station experiments.—In the normal milks there were from 1.23 to 1.29 pounds of fat for each pound of caseine and albumen in the milk, with an average of 1.24 pounds. Taking from the normal milk nearly one-fourth of its fat made the amount of caseine and albumen just equal to the fat; that is, for each pound of caseine and albumen in the skim-milk there was one pound of fat.

While the ratio varied considerably, it is pretty safe to say that, if the amount of fat in milk falls below 1.05 pounds for each pound of caseine and albumen, that milk has been skimmed some. This might not apply to the milk of individual cows, but it will probably be found to hold true of average factory milk.

2. It will be noticed that in experiments 24 and 29, in which partially skimmed milk was used, the amount of fat in the milk was just equal to, or less than, the amount of caseine and albumen in the milk and the amount of fat in the cheese was least, while the amount of caseine and albumen was greatest in these cases. The average amount of caseine and albumen in the various cheeses made from normal milk was 38.5 pounds; while in the two skim-milk cheeses, it was 41.8 pounds in 100 pounds of water-free cheese. On the other hand, the fat which, in the experiments with normal milk, averaged 54.5 pounds, dropped to 49.1 pounds in the skim-milk cheese.

3. In experiment 23, when cream was added to the whole-milk, the amount of fat was 1.28 times the amount of caseine and albumen, and the amount of fat in the cheese was greatest, being 56.7 pounds, or 2.2 pounds above the average. The amount of caseine and albumen, however, is least, dropping to 35.8 pounds, or 2.7 pounds below the average.

It would seem that, while the addition of fat, in small quantities, to whole-milk may not be readily detected with certainty from normal milk rich in fat, on the other hand, the removal of fat in small quantities from milk disturbs the proportions of milk-constituents to such an extent that the result appears in the cheese made from such milk. We have not at present enough data to enable us to state how sharply the dividing line may be drawn between normal and skim-milk, but it is hoped that additional data will enable us to detect from the composition of the cheese to what extent the milk has been skimmed, if at all.

Relation of Fat to Caseine and Albumen in Cheese as a Basis for Determining the Character of Milk.

TABLE SHOWING RELATION OF FAT TO CASEINE AND ALBUMEN IN CHEESE.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs of milk.	Pounds of fat in 100 lbs. of water- free cheese.	Pounds of caseine and albumen in 100 lbs. of water- free cheese.	Pounds of fat for one lb. of caseine and albumen in water-free cheese.
24*	2.95	48.6	42.7	1.14
21	3.45	54.9	39.1	1.40
15	3.50	54.8	40.1	1.37
18	3.52	52.0	40.9	1.27
16	3.60	53.1	40.3	1.32
19	3.60	52.3	39.6	1.33
17	3.61	52.9	39.8	1.33
22	3.67	53.3	38.3	1.40
20	3.70	54.1	40.0	1.35
23†	4.22	56.7	35.8	1.58
29*	3.20	49.6	40.8	1.21
27	3.90	54.7	37.0	1.48
28	3.90	54.8	36.3	1.51
31	3.95	56.2	36.8	1.53
32	3.95	55.5	38.3	1.45
25	4.00	55.5	37.0	1.50
26	4.00	56.7	37.8	1.50
30	4.10	56.4	36.2	1.56

* Partially skimmed. † Cream added.

Statement of Results.

1. The results of June show more variation than did those of May in respect to the relation of fat to caseine and albumen in cheese. The ratio was, in most cases, above 1.40, but in some of the factory milks dropped as low as 1.32, and in one case to 1.27.

2. In experiments 24 and 29, in which partially skimmed milk was used, the ratio of fat to caseine dropped to 1.14 and 1.21.

3. In experiment 23, in which some cream was added to the milk, the ratio, which in other factory milks was 1.40 or below, rose to 1.58.

4. It is significant that in the experiments of May and June, the ratio of fat to caseine and albumen in the cheese in no case rose above 1.22, when the milk was partially skimmed, while in no case did the ratio in a normal milk fall below 1.27, but in most cases was considerably above 1.30, and more often above 1.40.

INFLUENCE OF COMPOSITION OF MILK ON YIELD OF CHEESE.

Relation of Milk-Constituents to Yield of Cheese.

On the following page will be found a table showing relation of milk-constituents to yield of cheese.

TABLE SHOWING RELATION OF MILK-CONSTITUENTS TO YIELD OF CHEESE.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of caseine and albumen in 100 lbs. of milk.	Pounds of green cheese made from 100 lbs of milk.	Pounds of water in cheese made from 100 lbs of milk.	Pounds of fat in cheese made from 100 lbs of milk.	Pounds of caseine and albumen in cheese made from 100 lbs. of milk.	Pounds of sugar, ash, etc.
24*	2.95	3.26	9.10	3.47	2.73	2.40	0.50
21.	3.45	3.20	9.68	3.72	3.27	2.32	0.37
15.	3.50	3.27	9.74	3.60	3.36	2.46	0.32
18.	3.52	3.26	9.67	3.50	3.20	2.52	0.45
16.	3.60	3.26	9.90	3.49	3.40	2.58	0.42
19.	3.60	3.26	10.02	3.67	3.32	2.51	0.52
17.	3.61	3.23	9.90	3.56	3.35	2.52	0.47
22.	3.67	3.20	10.38	6.01	3.30	2.44	0.53
20.	3.70	3.26	9.65	3.42	3.37	2.49	0.37
23†	4.22	3.30	11.10	4.05	4.00	2.52	0.53
29*	3.20	3.21	9.41	3.53	2.92	2.40	0.56
27.	3.90	3.14	9.82	3.31	3.56	2.41	0.54
28.	3.90	3.14	9.98	3.44	3.58	2.37	0.59
31.	3.95	3.20	10.40	3.89	3.66	2.39	0.46
32.	3.95	3.20	10.30	3.74	3.64	2.51	0.41
25.	4.00	3.23	11.02	4.37	3.69	2.46	0.50
26.	4.00	3.23	10.90	4.25	3.77	2.51	0.37
30.	4.10	3.18	10.30	3.69	3.73	2.39	0.49

* Partially skimmed. † Cream added.

Yield of Green Cheese from 100 Pounds of Milk.

Statement of results.

1. Pounds of cheese made from 100 pounds of milk.

a. Factory experiments.—The yield of cheese from 100 pounds of milk varied from 9.10 to 11.10 pounds, and averaged 9.91 pounds. Taking only the experiments in which normal milk was used, the yield varied from 9.65 to 10.38 pounds, and averaged 9.87 pounds.

b. Station experiments.—The yield varied from 9.41 to 11.02 pounds, and averaged 10.27 pounds. Omitting the experiment in which skim-milk was used, the variation was from 9.82 to 11.02, with an average of 10.39 pounds.

2. Influence of stirred-curd and Cheddar processes upon yield of cheese:

NUMBER OF EXPERIMENT.	Process.	Pounds of cheese made from 100 lbs. of milk.
19.....	Cheddar	10.02
20.....	Stirred-curd	9.65
32.....	Cheddar	10.30
31.....	Stirred-curd	10.40

In one case, the Cheddar process made 0.37 pounds more of cheese; while in the other case, the stirred-curd process made 0.10 pounds more.

3. Influence of cutting curd in hard and soft condition upon yield of cheese:

NUMBER OF EXPERIMENT.	Condition of curd when cut.	Pounds of cheese made from 100 lbs. of milk.
15.....	Hard	9.74
16.....	Soft	9.90
25.....	Hard	11.02
26.....	Soft	10.90

In one case the soft-cut curd made more cheese, which was, in part, due to the difference in composition of milk. In the station experiments, when the same milk was used for the two experiments, the hard-cut curd made 0.12 pounds more.

4. Influence of heating curd at a temperature above 100 degrees F. upon yield of cheese:

NUMBER OF EXPERIMENT.	Temperature to which curd was heated.	Pounds of cheese made from 100 lbs. of milk.
	Degrees.	
17	100	9.90
18	106	9.67
28	100	9.98
27	106	9.82

In both cases the higher temperature gave a smaller yield.

5. Influence of skimming milk upon yield of cheese:

NUMBER OF EXPERIMENT.	Kind of milk.	Pounds of cheese made from 100 lbs. of milk.	Pounds of fat in 100 lbs. of milk.
24	Skimmed	9.10	2.95
23	Cream added....	11.10	4.22
29	Skimmed	9.41	3.20
30	Whole-milk	10.30	4.10

Removal of fat from the milk reduced the yield, while addition of fat increased the yield. In one case, a decrease of 1.27 pounds of fat in the milk produced a decrease of two pounds of cheese; in the other case, a removal of 0.9 pounds of fat from the milk reduced the yield 0.9 pounds.

Amount of Water Retained in Cheese Made from 100 Pounds of Milk.

1. Average of results:

Taking all the experiments of June, the water retained in the cheese made from 100 pounds of milk varied from 3.31 to 4.37 pounds, and averaged 3.70 pounds. Some of the more marked variations were due to especial conditions of manufacture, which we will now examine.

2. Influence of stirred-curd and Cheddar processes upon amount of water retained in cheese:

NUMBER OF EXPERIMENT	Process.	Pounds of water in cheese made from 100 lbs. of milk.
19.....	Cheddar	3.67
20.....	Stirred-curd	3.42
32.....	Cheddar	3.74
31.....	Stirred-curd	3.89

It will be seen that, in one case, the Cheddar process retained more water, while in the other, the stirred-curd process retained more water.

4. Influence of heating curd at a temperature above 100 degrees F. upon amount of water retained in cheese:

NUMBER OF EXPERIMENT.	Condition of curd when cut.	Pounds of water in cheese made from 100 lbs. of milk.
15.....	Hard	3.60
16.....	Soft	3.49
25.....	Hard	4.37
26.....	Soft	4.25

In both cases the hard-cut curd retained more moisture, in one case holding 0.11 pounds, and, in the other, 0.12 pounds more of water than in the soft-cut curd.

4. Influence of heating curd at a temperature above 100 F. upon amount of water retained in cheese:

NUMBER OF EXPERIMENT.	Temperature to which curd was heated	Pounds of water in cheese made from 100 lbs. of milk.
	Degrees.	
17.....	100	3.56
18.....	106	3.50
28.....	100	3.44
27.....	106	3.31

In both cases the use of a higher temperature caused retention of less water.

5. Influence of skimming milk upon amount of water retained in cheese:

NUMBER OF EXPERIMENT.	Kind o' milk.	Pounds of fat in 100 lbs. of milk.	Pounds of water in cheese made from 100 lbs. of milk.
24.....	Skimmed	2.95	3.47
23.....	Cream added	4.22	4.05
29.....	Skimmed	3.20	3.53
30.....	Whole-milk	4.10	3.69

As would be anticipated, taking fat from milk reduces the cheese-making constituents, and, therefore, the capacity for retaining moisture, under the same conditions of manufacture; adding fat to whole milk produces the opposite effect.

6. General summary.

The arrangement below shows the general relation between the amount of fat and caseine, and the amount of water retained, without reference to conditions of manufacture.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs of milk.	Pounds of caseine and albu- men in 100 lbs. of milk.	Pounds of water in cheese made from 100 lbs of milk.
24*.....	2.95	3.26	3.47
29*.....	3.20	3.21	3.53
15, 18, 21.....	3.50	3.24	3.61
16, 17, 19.....	3.60	3.25	3.57
20, 22.....	3.70	3.23	3.71
27, 28.....	3.90	3.14	3.37
31, 32.....	3.95	3.20	3.82
25, 26.....	4.00	3.23	4.31
30.....	4.10	3.18	3.69
23†.....	4.22	3.30	4.05

* Partially skimmed. † Cream added.

Amount of Fat Retained in Cheese made from 100 Pounds of Milk.

Statement of results.

Grouping and averaging results, we have the following table:

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of fat in cheese made from 100 lbs of milk.	Increase of fat in 100 lbs. of milk.	Increase of fat in cheese made from 100 lbs. of milk.
24	2.95	2.73	.....	.....
29	3.20	2.92	0.25	0.19
15, 18, 21	3.50	3.28	0.55	0.55
16, 17, 19	3.60	3.36	0.65	0.63
20, 22	3.70	3.39	0.75	0.66
27, 28	3.90	3.57	0.96	0.84
31, 32	3.95	3.65	1.00	0.92
25, 26	4.00	3.73	1.05	1.00
30	4.10	3.73	1.15	1.00
23	4.22	4.00	1.27	1.27

An examination of the last two columns in the preceding table indicates that when the fat in the milk increased the amount of fat retained in the cheese increased also, and, as a rule, followed quite closely the increase of fat in the milk, even in spite of marked variations in conditions of manufacture.

Amount of Caseine and Albumen Retained in Cheese made from 100 Pounds of Milk.

Statement of results.

Taking all the experiments of June, the caseine and albumen varied from 3.14 to 3.30 pounds in 100 pounds of milk, while the caseine and albumen retained in the cheese made from 100 pounds of milk varied from 2.37 to 2.58 pounds. This indicates pretty close uniformity in respect to the amount of caseine and albumen of the milk retained in the cheese even when the conditions of manufacture vary considerably.

TABLE SHOWING INFLUENCE OF DIFFERENT MILK-CONSTITUENTS IN INCREASING YIELD OF CHEESE.

NUMB R OF EXPERIMENT.	YIELD OF CHEESE FROM 100 POUNDS OF MILK.		POUNDS OF FAT IN CHEESE MADE FROM 100 LBS. OF MILK.		POUNDS OF CASEINE AND ALBUMEN IN CHEESE FROM 100 LBS. OF MILK.		POUNDS OF WATER, ASH, ETC., IN CHEESE FROM 100 LBS. OF MILK.	
	Increase of yield.	Decrease of yield.	Increase of fat in cheese.	Decrease of fat in cheese.	Increase of caseine and albumen in cheese.	Decrease of caseine and albumen in cheese.	Increase of water, etc., in cheese.	Decrease of water, etc., in cheese.
24	...	...	...	...	...	...	...	...
29	0.31	...	0.19	...	...	...	0.12	...
21	0.58	...	0.54	...	...	0.08	0.12	...
15	0.64	...	0.63	...	0.06	...	...	0.05
18	0.57	...	0.47	...	0.12	...	...	0.02
16	0.80	...	0.67	...	0.18	...	...	0.05
19	0.92	...	0.59	...	0.11	...	0.22	...
17	0.80	...	0.62	...	0.12	...	0.06	...
22	1.28	...	0.67	...	0.04	...	0.57	...
20	0.55	...	0.64	...	0.09	...	...	0.18
27	0.72	...	0.83	...	0.01	...	...	0.12
28	0.88	...	0.85	...	...	0.03	0.06	...
31	1.30	...	0.93	...	...	0.01	0.38	...
32	1.20	...	0.91	...	0.11	...	0.18	...
25	1.92	...	0.96	...	0.06	...	0.90	...
26	1.80	...	1.04	...	0.11	...	0.65	...
30	1.20	...	1.00	...	...	0.01	0.21	...
23	2.00	...	1.27	...	0.12	...	0.61	...

The order of arrangement of experiments in the preceding table is based upon amount of fat in milk, commencing with the lowest. For further explanation see report of Geo. A. Smith, in the Eighth Annual Report of the New York State Dairy Commissioner, and "Cheese Investigation and Experiments for May," in this report.

Statement of Results.

1. Influence of fat on yield of cheese.

In every case a portion of the increased yield of cheese was due to fat, varying from 0.19 to 1.27 pounds, for 100 pounds of milk. On an average 73.2 per cent of the increase of yield was due to increase of fat in the cheese.

2. Influence of caseine and albumen on yield of cheese.

a. In experiment 29, there was no increase of yield due to caseine and albumen.

b. In experiments 21, 28, 31 and 30, there was a decrease of caseine and albumen in the cheese varying from 0.01 to 0.08 pounds, and averaging about 0.03 pounds.

c. In all the other experiments the caseine and albumen contributed to increase in yield of cheese by amounts varying from 0.01 to 0.18 pounds, and averaging about 0.09 pounds.

d. Averaging all the experiments, it is found that 5.8 per cent of the increase of yield was due to increase of caseine and albumen in cheese. The small influence of caseine and albumen in relation to increasing the yield of cheese in June, as compared with May, is due to the fact that in June the different milks used contained nearly the same amount of caseine and albumen.

3. Influence of water, ash, etc., on yield of cheese.

a. In five cases there was a decrease of water, ash, etc., varying from 0.02 to 0.18 pounds, and averaging 0.08 pounds.

b. In the other cases there was an increase of water, ash, etc., in the cheese, varying from 0.06 to 0.90 pounds, and averaging 0.34 pounds.

c. Averaging all the experiments, it appears that about 21 per cent of the increase of yield was due to increase of water, ash, etc., in the cheese.

4. General summary:

Averaging all the experiments, we have the following:

	Pounds.	Per cent.
Averaged increased yield of cheese	1.03	....
Averaged increased yield of fat	0.75	73.2
Averaged increased yield of caseine and albumen..	0.06	5.8
Averaged increased yield of water, etc.....	0.22	21.0

In the June experiments, it appears that nearly three-fourths of the increase in the yield of cheese was due to increase of fat in the milk; about one-fifth was due to increased retention of water, ash, etc., and about one-sixteenth was due to increase of caseine and albumen.

TABLE SHOWING RELATION OF FAT IN MILK TO YIELD OF CHEESE.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs of milk.	Pounds of cheese made from 10, lbs of milk.	Pounds of cheese made for each pound of fat in milk.
24*	2.95	9.10	3.08
21.	3.4	9.68	.81
15.	3.50	9.74	2.78
18.	3.52	9.67	2.75
16.	3.60	9.90	2.75
19.	3.60	10.02	2.78
17.	3.61	9.90	2.74
22.	3.6	10.38	2.83
20.	3.70	9.65	2.61
23†	4.22	11.10	2.63
29*	3.20	9.41	2.94
27.	3.90	9.82	2.52
28.	3.90	9.98	2.56
31.	3.95	10.40	2.63
32.	3.95	10.30	2.61
25	.00	11.02	2.76
26.	4.00	10.90	2.73
30.	4.10	10.30	2.51

* Partially skimmed. † Cream added.

Statement of Results.

1. Pounds of cheese made for each pound of fat in milk.

a. Factory experiments.—The amount of cheese made for each pound of fat in the normal milks varied from 2.74 to 2.83 in seven out of eight experiments; in one case it was 2.61; the average was 2.76 pounds. These results are very close to those secured in the May factory experiments.

b. Station experiments.—Omitting the experiment in which skim-milk was used, the amount of cheese made for each pound of fat in the milk varied from 2.51 to 2.73 pounds, and averaged 2.62 pounds. Skimming the milk, as in experiments 24 and 29, increased the amount to about three pounds.

Grouping and averaging the different experiments, we have the following table:

NUMBER OF EXPERIMENTS.	Pounds of fat in 100 lbs. of milk.	Pounds of cheese made from 100 lbs. of milk.	Pounds of cheese made for each lb of fat in milk.
24*	2.95	9.10	3.08
29*	3.20	9.41	2.94
15, 18, 21	3.50	9.70	2.77
16, 17, 19	3.60	9.94	2.76
20, 22	3.70	10.02	2.71
27, 28	3.90	9.90	2.54
31, 32	3.95	10.35	2.62
25, 26	4.00	10.96	2.74
30	4.10	10.30	2.51
23†	4.22	11.10	2.63

* Partially skimmed. † Cream added.

Loss of Cheese in Weight for First Month.

TABLE SHOWING LOSS OF STATION CHEESE IN WEIGHT.

NUMBER OF EXPERIMENT	Weight of cheese when green.	Weight of cheese when one month old.	Pounds lost in four weeks	Pounds of loss in weight in four weeks for 100 lbs. of cheese.
29	22.63	20.78	1.85	8.17
27	24.56	22.78	1.78	7.25
28	24.94	22.97	1.97	7.90
31	26.00	23.84	2.16	8.31
32	25.75	23.88	1.87	7.26
25	27.56	25.25	2.31	8.38
26	27.25	25.2	2.00	7.34
30	25.75	23.81	2.94	7.53

Statement of Results.

The loss of weight during the first month varied from 1.78 to 2.31 pounds, and averaged about two pounds. Calculating for 100 pounds of cheese, the loss varied from 7.25 to 8.38 pounds, and averaged 7.77 pounds. The considerably greater average loss of the June over the May cheese is not surprising, when the difference in average temperature between June and July is considered.

TABLE SHOWING COMPARISON OF STATION CHEESE.

NUMBER OF EXPERIMENT.	Kind of cheese.	Date of manufacture.	Special condition of manufacture.	Flavor.	Body.	Texture.	Color.	Appearance.	Total number of marks.	Date of examination.
25	Cheddar....	June 27	Curd cut hard.....	40	25	15	15	5	100	July 26
26	Cheddar....	June 27	Curd cut soft.....	40	25	15	15	5	100	July 26
27	Cheddar....	June 28	Curd heated to 106° F..	35	20	15	15	5	90	July 26
28	Cheddar....	June 28	Usual conditions.....	40	25	15	15	5	100	July 26
29	Cheddar....	June 29	Milk partially skimmed.	40	25	15	15	5	100	July 26
30	Cheddar....	June 29	Whole-milk.....	40	20	15	15	5	95	July 26
31	Stirred-curd.	June 30	.....	40	25	15	15	5	100	July 26
32	Cheddar....	June 30	.....	35	20	10	15	5	85	July 26

Description of Commercial Qualities of Cheese.

No. 25. Flavor, perfect; body, solid, firm and smooth; texture, fine and close.

No. 26. Flavor, perfect; body, solid, firm and smooth; texture, fine and close.

No. 27. Flavor, somewhat imperfect; body, solid and smooth, but not as firm as should be; texture, fine and close.

No. 28. Flavor, perfect; body, solid, firm and smooth; texture, fine and close.

No. 29. Flavor, perfect; body, solid, firm and smooth; texture, fine and close.

No. 30. Flavor, perfect; body, solid, very smooth, but softer or less firm than in No. 29; texture, fine and close.

No. 31. Flavor, perfect; body, solid, firm and smooth; texture, fine and close.

No. 32. Flavor, slightly imperfect; body, smooth and firm, but not solid; texture, loose and open, or porous.

The following points are of interest in connection with this commercial examination of the cheese:

1. The cheese made when the curd was heated to 106 degrees F. was imperfect in flavor and deficient in body, while the other cheese, made the same day under usual conditions, was perfect in every way.

2. The cheese made from partially skimmed milk (fat 3.20 per cent) graded a little higher than the cheese made from the whole-milk (fat 4.10 per cent). The whole-milk cheese was not quite as solid in body as the other.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs of green cheese.	Pounds of caseine and albumen in 100 lbs. of green cheese.	Pounds of water in 100 lbs. of green cheese.	Pounds of fat for 1 lb. caseine and albumen in water-free cheese.	Pounds of fat for 1 lb. caseine and albumen in water-free cheese.	Pounds of water in 100 lbs. of milk.	Pounds of fat in cheese from 100 lbs. of milk.	Pounds of caseine and albumen in cheese from 100 lbs. of milk.	Pounds of cheese made for one lb. of fat in milk.	Pounds of milk required to make one lb. of cheese.	Pounds of loss in weight for 100 lbs. of cheese in four weeks.
Normal milk, 15, 18, 21.	33.61	36.19	37.21	1.35	1.35	9.70	3.98	2.45	2.77	10.20	.....
Normal milk, 16, 17, 19.	33.72	36.55	37.26	1.35	1.35	9.64	3.96	2.47	2.77	10.00	.....
Normal milk, 20, 23.	33.51	36.67	37.04	1.35	1.35	10.08	3.96	2.47	2.77	9.98	.....
Normal milk, 27, 28.	33.06	36.13	36.09	1.43	1.50	9.30	3.87	2.33	2.54	10.10	7.59
Normal milk, 31, 33.	33.36	36.69	36.86	1.43	1.50	10.26	3.95	2.45	2.55	9.66	7.79
Normal milk, 35, 36.	34.05	37.03	37.51	1.56	1.56	10.80	3.73	2.49	2.51	9.70	7.83
.....	35.20	37.24	37.80	1.14	1.14	9.10	3.42	2.40	2.58	11.00	.....
.....	35.41	37.41	37.88	1.31	1.31	9.41	3.53	2.40	2.54	10.03	8.17
.....	35.03	37.53	37.47	1.53	1.53	11.10	3.68	2.48	2.54	9.00	.....
.....	35.73	37.73	37.70	1.35	1.35	9.57	3.68	2.48	2.76	10.13	.....
.....	35.17	37.17	37.00	1.49	1.50	10.29	3.81	2.43	2.68	9.04	7.31
.....	35.46	37.46	37.03	1.35	1.35	10.11	3.71	2.45	2.68	9.90	.....
.....	34.87	37.87	37.50	1.49	1.49	9.91	3.43	2.45	2.76	10.10	.....
.....	35.05	37.05	37.53	1.35	1.35	10.27	3.57	2.45	2.68	9.76	7.77
.....	34.74	37.74	37.78	1.47	1.47	10.07	3.70	2.45	2.73	9.96	.....
.....	34.14	37.14	37.73	1.41	1.41	10.07	3.44	2.45	2.73	9.96	.....

SUMMARY OF RESULTS.

I. Loss of Milk-constituents in Cheese-making.

1. *Fat.*

a. Actual amount of fat lost in the whey for 100 pounds of milk was fairly uniform under the same conditions of manufacture and was practically independent of the amount of fat in the milk.

b. The average amount of fat lost in the whey, in all the experiments, was 0.27 pounds (a little over four ounces) for 100 pounds of milk, which was about 7.30 per cent of the fat in the milk. In the factory experiments, the average loss was about 7.50 per cent of the fat in the milk; in the station experiments, it was about 7 per cent of the fat in the milk.

2. *Caseine and albumen.*

a. The amount of caseine and albumen lost in the whey was quite uniform under all the conditions tried.

b. The average amount of caseine and albumen lost in the whey in all the June experiments, was about 0.78 pounds (about twelve and one-half ounces) for 100 pounds of milk, which was about 24 per cent of the caseine and albumen in the milk. The loss was practically the same in both the factory and the station experiments.

c. Taking all the milks, the caseine averaged 2.46 pounds, and the albumen 0.76 pounds, in 100 pounds of milk; for every pound of albumen, there were 3.3 pounds of caseine.

2. Influence of Composition of Milk on Composition of Cheese.

1. *Fat.*

a. The proportion of fat in the cheese increased, as a rule, when the amount of fat in the milk increased, but the increase of fat in the cheese was not uniform with the increase of fat in the milk. Green cheese made from factory milk that contained from 3.50 to 3.70 pounds of fat in 100 pounds of milk contained nearly 34 pounds of fat in 100 pounds of cheese. Cheese made from whole-milk to which cream has been added, and which con-

tained 4.22 pounds of fat in 100 pounds of milk contained 36 pounds of fat in 100 pounds of cheese. Cheese made from milk containing about 4 pounds of fat in 100 pounds of milk contained from 35 to 36 pounds of fat in 100 pounds of cheese. In case of milk partially skimmed, containing from 2.95 to 3.20 pounds of fat in 100 pounds of milk, the cheese contained 30 to 31 pounds of fat in 100 pounds of cheese. Basing a comparison of results upon the water-free cheese, instead of green cheese, we obtain results that are quite similar in their relations.

b. In general, the fat exercised a greater influence upon the composition of the cheese than did any other constituent of the milk.

2. Caseine and albumen.

a. In the cheese made from the normal milks, the amount of caseine and albumen in 100 pounds of cheese was a fairly uniform quantity, varying in the green cheese from 23 to 25 pounds; and, in the water-free cheese, varying from 37 to 40 pounds. The milks containing least fat made cheese containing a little more caseine and albumen. Skimming the milk increased largely the per cent of caseine and albumen in the cheese; while adding cream to whole-milk diminished the per cent of caseine and albumen in the cheese.

3. Relation of fat to caseine and albumen in cheese as a basis for determining the character of milk.

a. The results appear to indicate that, in the cheese made from normal milk containing from 3.5 to 4 pounds of fat in 100 pounds of milk, there should be about 1.3 pounds to 1.5 of fat for one pound of caseine and albumen in the water-free cheese. Partial skimming reduced this ratio to 1.21 and 1.14 pounds, while addition of cream raised it to 1.58 pounds.

3. Influence of Composition of Milk on Yield of Cheese.

1. Fat.

a. Of the increased yield of cheese obtained in the various experiments, nearly three-fourths of the increase, on an average, was due to an increase of fat in the milk from which the cheese was made.

b. The amount of fat retained in the cheese made from 100 pounds of milk increased when the amount of fat in the milk increased, but not with exact uniformity.

2. *Caseine and albumen.*

a. On an average, the increase of caseine and albumen in the milk produced about one-sixteenth of the increased yield of cheese observed in the various experiments.

b. The amount of caseine and albumen retained in the cheese made from 100 pounds of milk increased quite uniformly when the amount of caseine and albumen in the milk increased.

3. *Water.*

a. About one-fifth of the increased yield of cheese was due to an increased amount of water retained in the cheese.

b. The amount of water retained in the cheese made from 100 pounds of milk was quite variable and generally increased when either the fat or caseine and albumen in the milk increased.

4. *Yield of Cheese.*

1. *Pounds of cheese made from milk.*

a. Of the factory milk, there were required, on an average, 10.1 pounds to make one pound of cheese.

b. Of the station milk, 9.76 pounds sufficed to make one pound of cheese.

c. One hundred pounds of factory milk made, on an average, 9.9 pounds of green cheese; 100 pounds of station milk made 10.27 pounds of green cheese.

5. *Influence of Variation of Condition of Manufacture.*

1. *Variation in amount of rennet used.*

The comparison gave results that were not definite in respect to loss of constituents or yield of cheese.

2. *Cutting curd in hard and soft condition.*

a. Loss of milk-constituents.—In the one case, hard cutting gave greater loss of fat, while, in the other, the soft cutting gave larger loss. The difference was small in either case.

b. Yield.—The results regarding yields were not definite, the soft cutting giving more in one case and less in the other than the hard cutting.

3. *Comparison of stirred-curd and Cheddar processes.*

a. Loss of milk-constituents.—The loss was practically the same in both processes.

b. Yield.—In one case the Cheddar process gave a greater yield and, in the other, a smaller yield than the stirred curd process.

4. *Use of temperature above 100 degrees F. in heating curd.*

a. Loss of milk-constituents.—The use of a temperature of 106 degrees F. caused, in two comparisons, a noticeably greater loss of fat.

b. Yield.—The higher temperature gave in both cases a smaller yield than did the use of the ordinary temperature.

6. Loss of cheese in weight during first month.

a. The loss of weight varied, for the first month, from 7.25 to 8.38 pounds and averaged 7.77 pounds for each hundred pounds of green cheese.

CHEESE INVESTIGATION AND EXPERIMENTS FOR JULY.

In the experiments made at the station in July there was a good opportunity to study the effects of tainted milk upon cheese-making. A portion of the milk used was obtained some distance away, and the person who furnished it failed to follow the instructions given, which were to aerate and cool the milk carefully before shipping. Instead of doing this, the milk was put warm into cans which were imperfectly cleaned, ice was added and the cans closed at once and shipped. The weather was extremely warm and the conditions were nearly ideal for producing badly tainted milk. The milk was used two days, and we then decided to postpone the rest of the July work until we could secure milk from a more reliable source. However, the work proved instructive and highly suggestive.

Method Employed in Making Cheese from Tainted Milk.

In working with tainted milk, it has been generally noticed that the rennet does not act as readily, and that lactic acid is not produced as rapidly as in case of untainted milk. The result is apt to be that the curd does not contract well and hence contains large amounts of moisture, producing an inferior quality of cheese and a smaller yield. The method now practiced by our most successful cheese-makers in working tainted milk is to add a "starter," so as to produce a good degree of ripening as quickly as possible, and to use a somewhat larger amount of rennet to secure coagulation more rapidly. In this manner, a fairly good product may be made from badly tainted milk, though with diminished yield. The cheese-maker has a choice of two evils—he may follow the usual method employed in working good milk, when he will produce an inferior quality of cheese and a small yield, or he may use the method indicated above, when he will be able to make a fair product, with a small yield. Neither method will make cheese without considerable loss.

We hope to make, in the future, considerable study of tainted milk from the cheesemaker's and chemist's point of view.

Analyses of Milk, Whey and Cheese — Composition Expressed in Parts Per Hundred.

	Per cent of water.	Per cent of total solids.	Per cent of fat.	Per cent of caseine and albumen.	Per cent of caseine.	Per cent of albumen.	Per cent of sugar, ash, etc.
No. 33—July 5, 1892:							
Milk	87.34	12.66	3.70	3.10	2.54	0.56	5.86
Whey	93.17	6.83	0.23	0.86	.....	.....	5.74
Green cheese	34.40	65.60	34.76	24.75	23.61	1.14	6.09
No. 34—July 5:							
Milk	87.35	12.65	3.65	3.10	2.54	0.56	5.90
Whey	93.21	6.79	0.30	0.84	.....	.....	5.65
Green cheese	35.62	64.38	33.37	24.64	23.80	0.84	6.37
No. 35—July 6:							
Milk	87.45	12.55	3.70	3.10	2.50	0.60	5.75
Whey	93.05	6.95	0.35	0.82	.....	.....	5.78
Green cheese	33.96	66.04	34.72	24.70	23.86	0.84	6.62
No. 36—July 6:							
Milk	87.53	12.47	3.60	3.08	2.51	0.57	5.79
Whey	93.17	6.83	0.29	0.80	.....	.....	5.74
Green cheese	33.94	66.06	35.96	24.59	23.62	0.97	5.51
No. 37—July 7:							
Milk	87.35	12.65	3.75	3.07	2.51	0.56	5.83
Whey	93.22	6.78	0.37	0.85	.....	.....	5.56
Green cheese	34.55	65.45	34.68	24.33	23.25	1.08	6.44

Analyses of Milk, Whey and Cheese—Composition Expressed in Parts Per Hundred—(Concluded).

	Per cent of water.	Per cent of total solids.	Per cent of fat.	Per cent of caseine and albumen.	Per cent of caseine.	Per cent of albumen.	Per cent of sugar, ash, etc.
No. 38—July 7:							
Milk	87.53	12.47	3.50	3.08	2.50	0.58	5.89
Whey	93.06	6.94	0.39	0.78	.....	.....	5.77
Green cheese	34.96	65.04	34.08	24.70	23.75	0.95	6.26
No. 39—July 8:							
Milk	87.36	12.64	3.60	3.03	2.47	0.56	6.01
Whey	92.95	7.05	0.35	0.78	.....	.....	5.92
Green cheese	35.50	64.50	33.83	24.69	23.74	0.95	5.98
No. 40—July 8:							
Milk	87.27	12.73	3.50	3.10	2.51	0.59	6.13
Whey	92.80	7.20	0.50	0.79	.....	.....	5.91
Green cheese	36.25	63.75	32.12	24.89	23.74	1.15	6.74
No. 41—July 27:							
Milk	87.76	12.24	3.80	3.08	2.39	0.69	5.36
Whey	93.09	6.91	0.52	0.84	.....	...	5.55
Green cheese	37.88	62.12	33.58	24.55	23.52	1.03	3.99
No. 42—July 27:							
Milk	87.76	12.24	3.80	3.08	2.39	0.69	5.36
Whey	93.20	6.80	0.56	0.85	.....	.....	5.39
Green cheese	37.44	62.56	33.80	24.50	23.41	1.09	4.26

No. 43—July 28:									
Milk	87.48	12.52	3.90	3.23	2.62	0.61	5.39		
Whey	92.95	7.05	0.38	0.87	.....	.....	5.80		
Green cheese	38.46	61.54	33.61	24.81	23.66	1.15	3.12		
No. 44*—July 28:									
Milk	88.30	11.70	2.90	3.21	2.57	0.64	5.59		
Whey	93.04	6.96	0.27	0.84	.....	.....	5.85		
Green cheese	39.35	6.65	28.75	27.74	26.66	1.08	4.16		

* Partially skimmed.

Analyses of Milk, Whey and Cheese — FROM 100 POUNDS OF MILK.

	Pounds.	Pounds of water.	Pounds of total solids.	Pounds of fat.	Pounds of caseine and albumen.	Pounds of caseine.	Pounds of albumen.	Pounds of sugar, ash, etc.
No. 33—July 5:								
Milk.....	100	87.34	12.66	3.70	3.10	2.54	0.56	5.86
Whey.....	89.92	83.78	6.14	0.21	0.77	.....	.....	5.16
Cheese.....	10.08	3.47	6.61	3.50	2.49	2.38	0.11	0.62
No. 34—July 5:								
Milk.....	100	87.35	12.65	3.65	3.10	2.54	0.56	5.90
Whey.....	89.71	83.62	6.09	0.27	0.75	.....	.....	5.07
Cheese.....	10.29	3.67	6.62	3.43	2.53	2.45	0.08	0.66
No. 35—July 6:								
Milk.....	100	87.45	12.55	3.70	3.10	2.50	0.60	5.75
Whey.....	89.88	83.64	6.24	0.31	0.73	.....	.....	5.20
Cheese.....	10.12	3.44	6.68	3.51	2.50	2.41	0.09	0.67
No. 36—July 6:								
Milk.....	100	87.53	12.47	3.60	3.08	2.51	0.57	5.79
Whey.....	90.50	84.32	6.18	0.6	0.72	.....	.....	5.19
Cheese.....	9.50	3.22	6.28	3.42	2.34	2.24	0.10	0.52
No. 37—July 7:								
Milk.....	100	87.35	12.65	3.75	3.07	2.51	0.56	5.83
Whey.....	89.83	83.74	6.09	0.33	0.76	.....	.....	5.00
Cheese.....	10.17	3.51	6.66	3.53	2.47	2.37	0.10	0.68

No. 38—July 7:									
Milk	100	87.53	12.47	3.50	3.08	2.50	0.58	5.89	
Whey	90.32	84.05	6.27	0.35	0.71	.....	.....	5.21	
Cheese	9.68	3.38	6.30	3.30	2.39	2.30	0.09	0.61	
No. 39 — July 8:									
Milk	100	87.36	12.64	3.60	3.03	2.47	0.56	6.01	
Whey	90.12	83.77	6.35	0.31	0.70	.....	.....	5.34	
Cheese	9.88	3.51	6.37	3.34	2.44	2.35	0.09	0.59	
No. 40—July 8:									
Milk	100	87.27	12.73	3.50	3.10	2.51	0.59	6.13	
Whey	90.00	83.52	6.48	0.45	0.71	.....	.....	5.32	
Cheese	10.00	3.63	6.37	3.21	2.49	2.37	0.12	0.67	
No. 41—July 27:									
Milk	100	87.76	12.24	3.80	3.08	2.39	0.69	5.36	
Whey	90.10	83.87	6.23	0.46	0.76	.....	.....	5.01	
Cheese	9.90	3.75	6.15	3.32	2.43	2.33	0.10	0.40	
No. 42—July 27:									
Milk	100	87.76	12.24	3.80	3.08	2.39	0.69	5.36	
Whey	90.10	83.97	6.13	0.50	0.77	.....	.....	4.86	
Cheese	9.90	3.71	6.19	3.35	2.43	2.32	0.11	0.41	
No. 43—July 28:									
Milk	100	87.48	12.52	3.90	3.23	2.62	0.61	5.39	
Whey	89.70	83.38	6.32	0.34	0.78	.....	.....	5.20	
Cheese	10.30	3.96	6.34	3.46	2.56	2.44	0.12	0.32	

Analyses of Milk, Whey and Cheese—FROM 100 POUNDS OF MILK—(Concluded).

	Pounds.	Pounds of water.	Pounds of total solids.	Pounds of fat.	Pounds of caseine and albumen	Pounds of caseine.	Pounds of albumen.	Pounds of sugar, ash, etc.
No. 44*—July 28:								
Milk.....	100	88.30	11.70	2.90	3.21	2.57	0.64	5.59
Whey.....	90.65	84.34	6.31	0.24	0.76	.....	.....	5.31
Cheese.....	9.35	3.68	5.67	2.69	2.59	2.49	0.10	0.39

* Partially skimmed.

TABULATED STATEMENT OF THE PRINCIPAL CONDITIONS OF MANUFACTURE.

NUMBER OF EXPERIMENT.	Date.	Kind of cheese made.	Pounds of milk used.	Pounds of green cheese made.	Temperature of milk when rennet was added.	Ounces of rennet extract used per 1,000 lbs. of milk.	Time required for milk to begin to thicken.	Time from adding rennet to cutting curd.	Condition of curd when cut	Temperature used in heating curd after cutting.	Time taken to heat to 98 degrees F. or more.	Time from reaching required temperature to drawing whey.	Time from drawing whey to salting.	Ounces of salt used for each pound of fat in milk.	Time from salting to putting to press.	Type of whole operation.
33	1892. July 5	Cheddar	4,873	491	84	3	15	40	Hard	99	75	80	185	1.19	25	Hrs. Min. 40 8
34	July 5	Cheddar	4,364	449	84	3	17	27	Soft	96	76	55	115	1.20	15	6 50
35	July 6	Cheddar	5,097	516	84	3	16	26	Ordinary	98	68	57	110	1.19	20	6 26
36	July 6	Stirred-curd	4,176	396	82	3	18	27	Ordinary	96	78	79	25	1.22	85	6 30
37	July 7	Cheddar	4,112	418	83	3	20	32	Ordinary	96	59	58	95	1.18	30	7 25
38	July 7	Cheddar	5,921	486	84	3	20	29	Ordinary	96	72	105	125	1.26	20	7 55
39	July 8	Cheddar	5,001	494	83	3	20	26	Ordinary	96	67	55	145	1.22	25	7 05
40	July 8	Cheddar	4,088	408	83	6	13	16	Ordinary	96	80	52	138	1.24	20	7 15
41*	July 27	Cheddar	250	24.75	82	4	2	3	Ordinary	99	35	25	95	1.16	25	3 30
42*	July 27	Stirred-curd	250	24.70	82	4	2	5	Ordinary	99	37	13	29	1.16	110	3 30
43*	July 28	Cheddar	250	25.75	82	2.8	5	11	Ordinary	99	39	25	120	1.13	20	4 05
44*	July 28	Cheddar	235.7	23	84	3	5	9	Ordinary	98	44	15	140	1.51	20	4 30

* Milk was tainted.

Statement of Results

1. Time required for milk to begin to thicken after addition of rennet.

a. Factory experiments.—The time varied from thirteen to twenty minutes and averaged about seventeen minutes.

b. Station experiments.—The time varied from two to five minutes, and averaged three and one-half minutes.

2. Time from adding rennet to cutting curd.

a. Factory experiments.—The time varied from eighteen to forty minutes, and averaged about twenty-eight minutes.

b. Station experiments.—The time varied from three to eleven minutes, and averaged seven minutes.

3. Time required to heat to 98 degrees F., or more after cutting and stirring curd.

a. Factory experiments.—The time varied from fifty-nine to eighty minutes, and averaged about seventy-two minutes.

b. Station experiments.—The time varied from thirty-five to forty-four minutes and averaged about thirty-nine minutes.

4. Time from reaching 98 degrees F., or more, to drawing whey.

a. Factory experiments.—The time varied from fifty-two to 105 minutes, and averaged sixty-eight minutes.

b. Station experiments.—The time varied from thirteen to twenty-five minutes and averaged twenty minutes.

5. Time from drawing whey to salting curd.

a. Factory experiments.—The time varied from ninety-five to 145 minutes in the Cheddar process, averaging 123 minutes; in the stirred-curd process the time was twenty-five minutes.

b. Station experiments.—The time varied from ninety-five to 140 minutes, and averaged 118 minutes in the Cheddar process; in the stirred-curd process the time was twenty-nine minutes.

6. Time occupied by the whole operation of cheese-making.

a. Factory experiments.—The time varied from six hours and twenty minutes to over eight and one-half hours, and averaged about seven hours and fifteen minutes.

b. Station experiments.—The time varied from three hours and twenty minutes to four hours and thirty minutes, and averaged about four hours.

For explanation of data in the various tables following, see "Cheese Investigation and Experiments for May," in this report.

LOSS OF MILK-CONSTITUENTS IN CHEESE-MAKING.

TABLE SHOWING AMOUNT OF FAT RECOVERED AND LOST IN CHEESE-MAKING.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of fat lost in whey for 100 lbs. of milk.	Pounds of fat recovered in cheese for 100 lbs. of milk.	Per cent of fat in milk lost in whey.	Per cent of fat in milk recovered in cheese.
38.....	3.50	0.35	3.15	10.00	90.00
40.....	3.50	0.45	3.05	12.86	87.14
36.....	3.60	0.26	3.34	7.22	92.78
39.....	3.60	0.31	3.29	8.61	91.39
34.....	3.65	0.27	3.38	7.40	92.60
33.....	3.70	0.21	3.49	5.68	94.32
35.....	3.70	0.31	3.39	8.38	91.62
37.....	3.75	0.33	3.42	8.80	91.20
44*.....	2.90	0.24	2.66	8.28	91.72
41.....	3.80	0.46	3.34	12.10	87.90
42.....	3.80	0.50	3.30	13.16	86.84
43.....	3.90	0.34	3.56	8.70	91.30

Statement of Results.

1. Pounds of fat in 100 pounds of milk.

a. Factory experiments.—The fat in the milk varied from 3.50 to 3.75 pounds in 100 pounds of milk, and averaged 3.63 pounds.

b. Station experiments.—The fat in the milk varied from 3.80 to 3.90 pounds in 100 pounds of milk, when the milk was normal, and averaged 3.83 pounds. Including the one sample of skim-milk, the average was 3.60 pounds.

2. Pounds of fat lost for 100 pounds of milk.

a. Factory experiments.—The amount of fat lost in the whey varied from 0.21 to 0.45 pounds, and averaged 0.31 pounds for 100 pounds of milk. Including the one sample of skim-milk, the loss averaged 0.38 pounds.

b. Station experiments.—The amount of fat lost in the whey varied from 0.34 to 0.50 pounds, and averaged 0.43 pounds for 100 pounds of milk. Including the one sample of skim-milk, the loss averaged 0.38 pounds.

*Partially skimmed.

3. Per cent of fat in milk lost in whey.

a. Factory experiments.—The per cent of milk fat that was lost varied from 5.68 to 12.86 per cent, and averaged 8.54 per cent of the fat in the milk.

b. Station experiments.—The per cent of milk fat lost varied from 8.28 to 13.16 per cent, and averaged 10.56 per cent of the fat in the milk, including the skim-milk.

4. Comparison of stirred-curd and Cheddar processes with reference to loss of fat.

a. Factory experiments.—In experiment 35 the Cheddar process was employed, and in experiment 36, made the same day, the stirred-curd process was used. The loss of fat was slightly less in the stirred-curd process.

b. Station experiments.—In experiment 42 the stirred-curd process was used; in 41 the Cheddar process. The loss of fat was slightly greater in the stirred-curd process.

5. Influence of cutting curd in hard and soft condition upon loss of fat.

a. Factory experiments.—In experiment 33 the curd was cut hard; in experiment 34 it was cut soft. The proportion of fat lost was a little less in case of the hard cutting, being as 5.68 to 7.40 per cent of the fat in the milk.

6. Influence of using different amounts of rennet upon loss of fat.

a. Factory experiments.—In experiment 39, three ounces of rennet-extract were used for 1,000 pounds of milk; in 40, six ounces were used. The loss was greater when the larger amount of rennet was used, being as 12.86 per cent to 8.61 per cent of the fat in the milk.

7. Influence of tainted milk upon loss of fat.

While the average loss of fat in cheese-making averages about 0.30 pounds for 100 pounds of ordinary milk, we find that in experiments 41 and 42, when the milk was most seriously tainted, the loss averaged nearly 0.50 pounds for 100 pounds of milk. This would mean an added loss of fat of about two pounds for each thousand pounds of milk. Though the notes taken by the

makers at the factory did not mention the condition of the milk, it is highly probable that the comparatively large losses shown in experiments 38 and 40 were due to tainted milk.

In experiment 44 the comparatively small loss of fat may have been due to the fact that nearly one-fourth of the milk used had been passed through a separator.

8. General summary.

Grouping together the different experiments in which milks of similar composition were used, and averaging the results, we obtain the following table:

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of fat lost in whey for 100 lbs. of milk.	Pounds of fat recovered in cheese for 100 lbs. of milk.	Per cent of fat in milk lost in whey.	Per cent of fat in milk recovered in cheese.
44*	2.90	0.24	2.66	8.28	91.72
38, 40	3.50	0.40	3.10	11.43	88.57
36, 39	3.60	0.28	3.32	7.78	92.22
34	3.65	0.27	3.38	7.40	92.60
33, 35	3.70	0.26	3.44	7.03	92.97
37	3.75	0.33	3.42	8.80	91.20
41, 42	3.80	0.48	3.32	12.63	87.37
43	3.90	0.34	3.56	8.70	91.30

Taking the eleven July experiments in which normal milk was used, the average amount of fat in 100 pounds of milk was 3.68 pounds; of this fat, about 0.34 pounds (a little over five ounces) or 9.24 per cent of the fat in the milk was lost in the whey for each hundred pounds of milk, while 3.34 pounds of fat were recovered in the cheese. It appears in general, from the results of the experiments thus far completed this season, that the loss of fat in cheese-making is independent of the amount of fat in the milk, when normal milk is used, but it is more largely dependent upon the condition of the milk and the special conditions of manufacture employed.

* Partially skimmed.

Amount of Caseine and Albumen Recovered and Lost in Cheese-making.

TABLE SHOWING AMOUNT OF CASEINE AND ALBUMEN RECOVERED AND LOST IN CHEESE-MAKING.

NUMBER OF EXPERIMENT.	Pounds of caseine and albumen in 100 lbs of milk.	Pounds of caseine and albumen lost in whey for 100 lbs. of milk.	Pounds of caseine and albumen recovered in whey for 100 lbs. of milk.	Per cent of caseine and albumen in milk lost in whey.	Per cent of caseine and albumen in milk recovered in cheese.
38	3.08	0.71	2.37	23.05	76.95
40	3.10	0.71	2.39	22.90	77.10
36	3.08	0.72	2.36	23.37	76.63
39	3.03	0.70	2.33	23.10	76.90
34	3.10	0.75	2.35	24.20	75.80
33	3.10	0.77	2.33	24.84	75.16
35	3.10	0.73	2.37	23.55	76.45
37	3.07	0.76	2.31	24.76	75.24
44	3.21	0.76	2.45	23.68	76.32
41	3.08	0.76	2.32	24.67	75.32
42	3.08	0.77	2.31	25.00	75.00
43	3.23	0.78	2.45	24.15	75.85

Statement of Results.

1. Pounds of caseine and albumen in 100 pounds of milk.

a. Factory experiments.—The amount of caseine and albumen varied from 3.03 to 3.10 pounds in 100 pounds of milk, and averaged 3.08 pounds.

b. Station experiments.—The amount of caseine and albumen varied from 3.08 to 3.23 pounds in 100 pounds of milk, and averaged 3.15 pounds.

2. Pounds of caseine and albumen lost in whey for 100 pounds of milk.

a. Factory experiments.—The amount of caseine and albumen lost in the whey varied from 0.70 to 0.77 pounds for each hundred pounds of milk, and averaged 0.73 pounds.

b. Station experiments.—The amount of caseine and albumen lost in the whey varied from 0.76 to 0.78 pounds, and averaged 0.77 pounds for 100 pounds of milk.

3. Per cent of caseine and albumen in milk lost in whey.

a. Factory experiments.—The per cent of caseine and albumen that was lost in the whey varied from 22.90 to 24.84 per cent of the caseine and albumen in the milk, and averaged 23.07 per cent.

b. Station experiments.—The per cent of caseine and albumen lost in the whey varied from 23.68 to 25.00 per cent of the caseine and albumen in the milk, and averaged 24.45 per cent.

4. Variations of conditions of manufacture, such as using Cheddar and stirred-curd processes, varying the amount of rennet, employing higher temperature for heating curd, cutting curd soft and hard, and skimming milk, appeared to influence very little, if at all, the amounts of caseine and albumen lost in the whey. The tainted milk showed slightly larger loss.

5. General summary.

Taking all the July experiments, the amount of caseine and albumen averaged 3.10 pounds in 100 pounds of milk; of this amount nearly 0.74 pounds (about 12 ounces), or 23.90 per cent of the caseine and albumen in the milk, were lost in the whey for each 100 pounds of milk, while 2.36 pounds were recovered in the cheese. From the season's experiments it would appear as if the proportion of caseine and albumen lost were quite uniform, being about twenty-four per cent of the amount present in the milk, and this loss is not much influenced by variation of conditions of manufacture, so far as we have yet experimented.

Relation of Caseine and Albumen to Milk — TABLE SHOWING RELATION OF CASEINE TO ALBUMEN IN MILK.

NUMBER OF EXPERIMENT.	Pounds of caseine and albumen in 100 lbs. of milk.	Pounds of caseine in 100 lbs. of milk.	Pounds of albumen in 100 lbs. of milk.	Pounds of caseine for 100 lbs. of caseine and albumen.	Pounds of albumen for 100 lbs. of caseine and albumen.	Pounds of caseine for 1 lb. of albumen in milk.
38.....	3.08	2.50	0.58	81.17	18.83	4.3
40.....	3.10	2.51	0.59	80.97	19.03	4.2
36.....	3.08	2.51	0.57	81.50	18.50	4.4
39.....	3.03	2.47	0.56	81.50	18.50	4.4
34.....	3.10	2.54	0.56	81.93	18.07	4.5
33.....	3.10	2.54	0.56	81.93	18.07	4.5
35.....	3.10	2.50	0.60	80.64	19.36	4.1
37.....	3.07	2.51	0.56	81.76	18.24	4.5
44.....	3.21	2.57	0.64	80.00	20.00	4.0
41.....	3.08	2.39	0.69	77.60	22.40	3.5
42.....	3.08	2.39	0.69	77.60	22.40	3.5
43.....	3.23	2.62	0.61	81.10	18.90	4.3

Statement of Results.

1. Pounds of caseine and albumen in 100 pounds of milk:

a. Factory experiments.—The amount of caseine and albumen averaged 3.08 pounds.

b. Station experiments.—The amount of caseine and albumen averaged 3.15 pounds.

2. Pounds of caseine in 100 pounds of milk.

a. Factory experiments.—The caseine varied from 2.47 to 2.54 pounds, and averaged 2.51 pounds in 100 pounds of milk.

b. Station experiments.—The caseine varied from 2.39 to 2.62 pounds, and averaged 2.49 pounds in 100 pounds of milk.

3. Pounds of albumen in 100 pounds of milk:

a. Factory experiments.—The amount of albumen varied from 0.56 to 0.60 pounds, and averaged 0.57 pounds in 100 pounds of milk.

b. Station experiments.—The albumen varied from 0.61 to 0.69 pounds, and averaged about 0.66 pounds in 100 pounds of milk.

4. Pounds of caseine for one pound of albumen in milk:

a. Factory experiments.—For each pound of albumen in the milk, the caseine varied from 4.1 to 4.5 pounds, and averaged 4.4 pounds.

b. Station experiments.—For each pound of albumen in the milk, the caseine varied from 3.5 to 4.3 pounds, and averaged nearly 3.8 pounds.

5. General summary.

In all the July experiments the average amount of caseine and albumen was 3.10 pounds in 100 pounds of milk; of this amount about 2.50 pounds, or 80.65 per cent consisted of caseine, while 0.60 pounds or 19.35 per cent consisted of albumen. There were, on an average, 4.2 pounds of caseine to one pound of albumen.

INFLUENCE OF COMPOSITION OF MILK ON COMPOSITION
OF CHEESE.

Influence of Fat in Milk on Composition of Cheese.

TABLE SHOWING RELATION OF FAT IN MILK TO FAT IN CHEESE.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of fat in 100 lbs. of water-free cheese.	Pounds of fat in 100 lbs. of water- free cheese for one lb. of fat in milk.
38.....	3.50	52.4	15.0
40.....	3.50	50.4	14.4
36.....	3.60	54.4	15.1
39.....	3.60	52.4	14.6
34.....	3.65	51.8	14.2
33.....	3.70	53.0	14.3
35.....	3.70	52.6	14.4
37.....	3.75	53.0	14.2
44*.....	2.90	47.4	16.1
41.....	3.80	54.1	14.2
42.....	3.80	54.0	14.0
43.....	3.90	54.6	14.2

Statement of Results.

1. Amount of fat in 100 pounds of milk.
 - a. Factory experiments.—The fat varied from 3.50 to 3.75 pounds, and averaged 3.63 pounds in 100 pounds of milk.
 - b. Station experiments.—The fat varied from 2.90 to 3.90 pounds, and averaged 3.60 pounds in 100 pounds of milk.
2. Amount of fat in 100 pounds of water-free cheese.
 - a. Factory experiments.—The fat varied from 50.4 to 54.4 pounds, and averaged 52.5 pounds in 100 pounds of water-free cheese.
 - b. Station experiments.—The fat varied from 47.4 to 54.6 pounds and averaged 52.5 pounds in 100 pounds of water-free cheese.
3. Pounds of fat in 100 pounds of cheese for one pound of fat in milk.

* Partially skimmed.

a. Factory experiments.—For each pound of fat in milk there were in 100 pounds of cheese from 14.1 to 15.1 pounds of fat, with an average of 14.5 pounds.

b. Station experiments.—For each pound of fat in milk there were 100 pounds of cheese from 14.1 to 16.4 pounds of fat, with an average of 14.6 pounds.

4. So far as this season's data go, we are justified in saying that water-free cheese containing less than fifty per cent of fat is made from milk that has been skimmed.

Influence of Caseine and Albumen in Milk on Composition of Cheese.

TABLE SHOWING RELATION OF CASEINE AND ALBUMEN IN MILK TO CASEINE AND ALBUMEN IN CHEESE.

NUMBER OF EXPERIMENT.	Pounds of caseine and albumen in 100 lbs. of milk.	Pounds of caseine and albumen in 100 lbs. of water-free cheese.	Pounds of caseine and albumen in 100 lbs. of water-free cheese for one lb. of caseine and albumen in milk.	Pounds of fat for one lb. of caseine and albumen in milk.
38	3.08	38.0	12.3	1.14
40	3.10	39.0	12.6	1.13
36	3.08	37.3	12.1	1.17
39	3.03	38.3	12.6	1.19
34	3.10	38.3	12.4	1.18
33	3.10	37.7	12.2	1.19
35	3.10	37.4	12.1	1.19
37	3.07	37.2	12.2	1.22
44*	3.21	45.7	14.2	0.90
41	3.08	39.5	12.8	1.23
42	3.08	39.2	12.7	1.23
43	3.23	40.3	12.5	1.21

Statement of Results.

1. Pounds of caseine and albumen in 100 pounds of milk.

a. Factory experiments.—The amount of caseine and albumen varied from 3.03 to 3.10 pounds, and averaged 3.08 pounds in 100 pounds of milk.

* Partially skimmed.

b. Station experiments.—The amount of caseine and albumen varied from 3.08 to 3.23 pounds, and averaged 3.15 pounds.

2. Pounds of caseine and albumen in 100 pounds of water-free cheese.

a. Factory experiments.—The amount of caseine and albumen varied from 37.2 to 39 pounds in 100 pounds of water-free cheese, and averaged 37.9 pounds.

b. Station experiments. The amount of caseine and albumen in 100 pounds of water-free cheese varied from 39.5 to 45.7 pounds, and averaged 41.2 pounds.

3. Effect of skimming milk and adding cream to milk upon the proportion of caseine and albumen in cheese.

While skimming milk does not cause any marked change in the per cent of caseine and albumen in the milk, it does cause a marked difference in the amount of caseine and albumen relative to the fat, and, therefore, produces a change in the composition of the cheese. In experiment 44 the milk was partially skimmed, and the amount of caseine and albumen in the cheese was highest in all the July experiments.

4. Pounds of caseine and albumen in 100 pounds of cheese for one pound of caseine and albumen in milk.

a. Factory experiments.—The ratio varied from 12.1 to 12.6, and averaged 12.3.

b. Station experiments.—The ratio varied from 12.5 to 12.8 for normal milks, or from 12.5 to 14.2 for all, and averaged 13.1.

5. Pounds of fat for one pound of caseine and albumen in milk.

a. Factory experiments.—There were for each pound of caseine and albumen in the milk from 1.13 to 1.22 pounds of fat in the milk, with an average of 1.18 pounds.

b. Station experiments.—The fat varied from 1.21 to 1.23 pounds for each pound of caseine and albumen in the normal milk, and averaged 1.22. In the milk which was partially skimmed, the fat amounted to 0.9 pounds for one pound of caseine and albumen.

Relation of Fat to Caseine and Albumen in Cheese as a Basis for Determining the Character of Milk.

TABLE SHOWING RELATION OF FAT TO CASEINE AND ALBUMEN IN CHEESE.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 pounds of milk.	Pounds of fat in 100 pounds of water-free cheese.	Pounds of casein and albumen in 100 pounds of water-free cheese.	Pounds of fat for one pound of casein and albumen in water-free cheese.
38.....	3.50	52.4	38.0	1.41
40.....	3.50	50.4	39.0	1.30
36.....	3.60	54.4	37.3	1.45
39.....	3.60	52.4	38.3	1.37
34.....	3.65	51.8	38.3	1.35
33.....	3.70	53.0	37.7	1.41
35.....	3.70	52.6	37.4	1.41
37.....	3.75	53.0	37.2	1.42
44*.....	3.90	47.4	45.7	1.04
41.....	3.80	54.1	39.5	1.37
42.....	3.80	54.0	39.2	1.38
43.....	3.90	54.6	40.3	1.36

Statement of Results.

Taking all the July experiments, the amount of fat in the water-free cheese varied from 1.30 to 1.41 pounds for each pound of caseine and albumen in the cheese made from normal milk. Excepting one case, the variation was between 1.35 and 1.42. When the milk was partially skimmed, the proportion of fat dropped to 1.04 pounds. These results are in harmony with those previously secured.

* Partially skimmed.

Influence of Composition of Milk on Yield of Cheese.

TABLE SHOWING RELATION OF MILK-CONSTITUENTS TO YIELD OF CHEESE.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of caseine and albumen in 100 lbs. of milk.	Pounds of green cheese made from 100 lbs. of milk.	Pounds of water in cheese made from 100 lbs. of milk.	Pounds of fat in cheese made from 100 lbs. of milk.	Pounds of caseine and albumen in cheese made from 100 lbs. of milk.	Pounds of sugar, ash, etc., in cheese made from 100 lbs. of milk.
44*	2.90	3.21	9.35	3.68	2.69	2.59	0.39
38	3.50	3.08	9.68	3.38	3.30	2.39	0.61
40	3.50	3.10	10.00	3.63	3.21	2.49	0.67
36	3.60	3.08	9.50	3.22	3.42	2.34	0.52
39	3.60	3.03	9.88	3.51	3.34	2.44	0.59
34	3.65	3.10	10.29	3.67	3.43	2.53	0.66
33	3.70	3.10	10.08	3.47	3.50	2.49	0.62
35	3.70	3.10	10.12	3.44	3.51	2.50	0.67
37	3.75	3.07	10.17	3.51	3.53	2.47	0.66
41	3.80	3.08	9.90	3.75	3.32	2.43	0.40
42	3.80	3.08	9.90	3.71	3.35	2.43	0.41
43	3.90	3.23	10.30	3.96	3.46	2.56	0.32

Yield of Green Cheese from 100 Pounds of Milk.

Statement of Results.

1. Pounds of cheese made from 100 pounds of milk.

a. Factory experiments.— The yield of cheese from 100 pounds of milk varied from 9.50 to 10.29 pounds, and averaged 9.97 pounds.

b. Station experiments.— The yield varied from 9.35 to 10.30 pounds, and averaged 9.86 pounds. Omitting the experiment in which skimmed milk was used, the variation was from 9.90 to 10.30, with an average of 10.03 pounds.

2. Influence of stirred-curd and Cheddar processes upon yield of cheese:

NUMBER OF EXPERIMENT.	Process.	Pounds of cheese made from 100 lbs. of milk.
35.....	Cheddar	10.12
36.....	Stirred-curd	9.50
41.....	Cheddar	9.99
42.....	Stirred-curd	9.90

* Partially skimmed.

In one case, the Cheddar process made 0.62 pounds more of cheese; while, in the other case, the two processes gave the same results.

3. Influence of cutting curd in hard and soft condition upon yield of cheese:

NUMBER OF EXPERIMENT.	Condition of curd when cut.	Pounds of cheese made from 100 lbs. of milk.
33.....	Hard	10.08
34.....	Soft	10.29

The soft-cut curd made more cheese, which was mainly due to increased retention of water.

3. Influence of skimming milk upon yield of cheese:

NUMBER OF EXPERIMENT.	Kind of milk.	Pounds of cheese made from 100 lbs. of milk.	Pounds of fat in 100 lbs. of milk.
44.....	Skimmed	9.35	2.90
43.....	Whole-milk ...	10.30	3.90

Removal of fat from milk reduced the yield. A removal of one pound of fat from the milk reduced the yield 0.95 pounds.

4. Influence of tainted milk upon yield of cheese.

In experiments 42 and 43 the yield was 9.90 pounds from 100 pounds of milk. Calculating the yield of cheese which milk of such composition should give, we find that the amount should be about 10.10 pounds, which indicates a loss of 0.20 pounds of cheese for each 100 pounds of milk, or two pounds of cheese for 1,000 pounds of milk. If the milk had not been handled with consummate skill by the makers, the loss would have been much greater.

Amount of Water Retained in Cheese made from 100 Pounds of Milk.

1. Average of results.

Taking all the experiments of July the water retained in the cheese made from 100 pounds of milk varied from 3.22 to 3.96 pounds, and averaged 3.58 pounds. Some of the more marked variations were due to especial conditions of manufacture, which we will now examine.

2. Influence of stirred-curd and Cheddar processes upon amount of water retained in cheese.

NUMBER OF EXPERIMENT.	Process.	Pounds of water in cheese made from 100 lbs. of milk.
35.....	Cheddar	3.44
36.....	Stirred-curd	3.22
41.....	Cheddar	3.75
42.....	Stirred-curd	3.71

It will be seen that, in one case, the Cheddar process retained 0.22 pounds more water, while in the other, it retained only 0.04 pounds more water.

3. Influence of cutting curd in hard and soft condition upon amount of water retained in cheese.

NUMBER OF EXPERIMENT.	Condition of curd when cut.	Pounds of water in cheese made from 100 lbs. of milk.
33.....	Hard	3.47
34... ..	Soft	3.67

The soft-cut curd retained 0.20 pounds more moisture than the hard-cut curd.

Amount of Fat Retained in Cheese made from 100 Pounds of Milk.

Statement of Results.

Grouping and averaging results, we have the following table:

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of fat in cheese made from 100 lbs. of milk.	Increase of fat in 100 lbs. of milk.	Increase of fat in cheese made from 100 lbs. of milk.
44	2.90	2.69	.....	.....
38, 40	3.50	3.25	0.60	0.56
36, 39	3.60	3.37	0.70	0.68
34	3.65	3.43	0.75	0.74
33, 35	3.70	3.50	0.80	0.80
37	3.75	3.53	0.85	0.84
41, 42	3.80	3.35	0.90	0.64
43	3.90	3.46	1.00	0.77

An examination of the last two columns in the preceding table indicates that when the fat in the milk increased, the amount of fat retained in the cheese increased also; and, as a rule, followed quite closely the increase of fat in the milk, even in spite of marked variations in conditions of manufacture. In experiments 41, 42 and 43, it will be noticed that the increase of fat retained in the cheese fell considerably short of the increase of fat in the milk. This was due to loss of fat resulting from the use of tainted milk.

Amount of Caseine and Albumen Retained in Cheese made from 100 Pounds of Milk.

Statement of Results.

Taking all the experiments of June, the caseine and albumen varied from 3.03 to 3.23 pounds in 100 pounds of milk, while the caseine and albumen retained in the cheese made from 100 pounds of milk varied from 2.34 to 2.59 pounds. This indicates pretty close uniformity in respect to the amount of caseine and albumen of the milk retained in the cheese even when the conditions of manufacture vary considerably.

INFLUENCE OF DIFFERENT MILK-CONSTITUENTS IN INCREASING YIELD OF CHEESE.

NUMBER OF EXPERIMENT.	YIELD OF CHEESE FROM 100 POUNDS OF MILK.		POUNDS OF FAT IN CHEESE MADE FROM 100 LBS. OF MILK.		POUNDS OF CASEINE AND ALBUMEN IN CHEESE MADE FROM 100 LBS. OF MILK.		POUNDS OF WATER, ASH, ETC., IN CHEESE MADE FROM 100 LBS. OF MILK.	
	Increase of yield.	Decrease of yield.	Increase of fat in cheese.	Decrease of fat in cheese.	Increase of caseine and albumen in cheese.	Decrease of caseine and albumen in cheese.	Increase of water, etc., in cheese.	Decrease of water, etc., in cheese.
44	0.33	.....	0.61	.....	.....	0.20	.....	.....
38	0.65	.....	0.52	.....	.....	0.10	0.23	0.08
40	0.15	.....	0.73	.....	.....	0.25	.....	0.33
36	0.53	.....	0.65	.....	.....	0.15	0.03	.....
39	0.94	.....	0.74	.....	.....	0.06	0.26	.....
34	0.73	.....	0.81	.....	.....	0.10	0.02	.....
33	0.77	.....	0.82	.....	.....	0.09	0.04	.....
35	0.82	.....	0.84	.....	.....	0.12	0.10	.....
37	0.55	.....	0.63	.....	.....	0.16	0.08	.....
41	0.55	.....	0.66	.....	.....	0.16	0.05	.....
42	0.95	.....	0.77	.....	.....	0.03	0.21	.....
43		.....		.....	.....

The order of arrangement of experiments in the preceding table is based upon amount of fat in milk, commencing with the lowest. For further explanation see report of Geo. A. Smith, in the Eighth Annual Report of the New York State Dairy Commissioner, and "Cheese Investigation and Experiments for May," in this report.

Statement of Results.

1. Influence of fat on yield of cheese.

In nearly every case the increased yield of cheese over the first (experiment 44) was almost entirely due to increase of fat retained in the cheese.

2. Influence of caseine and albumen on yield of cheese.

It so happened that the amount of caseine and albumen retained in the cheese in experiment 44 was greater than in any other; hence, in all the other July experiments the caseine and albumen in no case increased the yield of cheese over the yield in experiment 44, but diminished the yield as compared with experiment 44 by amounts varying from 0.03 to 0.25 pounds, and averaging about 0.13 pounds.

3. Influence of water, ash, etc., on yield of cheese.

In experiments 36 and 38 there was a decrease of water, ash, etc., while in all other cases there was an increase, varying from 0.02 to 0.26 pounds, and averaging 0.11 pounds, which was 8.75 per cent of the increase of yield.

4. General summary.

We obtain the following averages from the foregoing table:

	Pounds.	Per cent
Average increase yield of cheese.....	0.63	.....
Average increase yield of fat.....	0.71	112.70
Average decreased yield of caseine and albumen..	0.13	20.63
Average increased yield of water, etc.....	0.05	7.93

In the July experiments it appears that while the increase of fat in the cheese was greater than the increased yield of cheese, the caseine and albumen in the same cheeses decreased and thus contributed nothing to increasing the yield of cheese, but actually

tended to lower the yield as compared with experiment 44. There was a small increase of yield from increase of water, etc., retained in the cheese. After adjusting the gains and losses due to increase or decrease of constituents in the cheese we can say that of the actual increase of yield 93.42 per cent was due to fat, 6.58 per cent to water, ash, etc., and nothing to caseine and albumen.

TABLE SHOWING RELATION OF FAT IN MILK TO YIELD OF CHEESE.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of cheese made from 100 lbs. of milk.	Pounds of cheese made for each pound of fat in milk.
38.....	3.50	9.68	2.76
40.....	3.50	10.00	2.86
36.....	3.60	9.50	2.64
39.....	3.60	9.48	2.75
34.....	3.65	10.29	2.81
33.....	3.70	10.08	2.73
35.....	3.70	10.12	2.73
37.....	3.75	10.17	2.71
44*.....	2.90	9.35	3.23
41.....	3.80	9.90	2.60
42.....	3.80	9.90	2.60
43.....	3.90	10.30	2.64

Statement of Results.

1. Pounds of cheese made for each pound of fat in milk.
 - a. Factory experiments.—The amount of cheese made for each pound of fat in the normal milks varied from 2.71 to 2.86 in seven out of eight experiments; in one case it was 2.64; the average was 2.75 pounds.
 - b. Station experiments.—Omitting the experiment in which skim-milk was used, the amount of cheese made for each pound of fat in the milk varied from 2.60 to 2.64 pounds, and averaged 2.61 pounds.
- Skimming the milk as in 44 increased the amount to about 3.23 pounds.

* Partially skimmed.

Commercial Qualities of Cheeses.

The cheeses made from tainted milk were imperfect in flavor, being slightly bitter and somewhat strong. In body, they were fairly solid and firm. In texture, they were rather loose and inclined to crumble easily.

It has already been shown that loss in yield was caused by the tainted milk and a commercial examination showed that the yield was inferior in quality.

TABULATED SUMMARY OF RESULTS

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of fat lost in milk.	Pounds of caseine and albumen in 100 lbs. of milk.	Pounds of caseine and albumen lost in whey for 100 lbs. of milk.	Per cent of caseine and albumen in milk lost in whey.	Pounds of caseine in 100 lbs. of milk.	Pounds of albumen in 100 lbs. of milk.	Pounds of caseine for one pound of albumen in milk.	Pounds of fat for one lb. of caseine and albumen in milk.
Normal milk, 38, 40	3.66	0.49	8.48	0.71	23.26	2.60	0.59	4.4	1.13
Normal milk, 36, 39	3.60	0.35	8.10	0.71	23.30	2.49	0.57	4.4	1.18
Normal milk, 34	3.55	0.37	8.10	0.70	24.30	2.54	0.56	4.5	1.16
Normal milk, 33, 35	3.70	0.36	8.07	0.76	24.30	2.53	0.56	4.3	1.19
Normal milk, 37	3.76	0.53	8.06	0.77	24.76	2.51	0.56	4.5	1.22
Normal milk, 41, 42	3.80	0.46	8.33	0.78	25.00	2.39	0.60	3.5	1.25
Normal milk, 43	3.80	0.34	8.31	0.78	24.15	2.68	0.61	4.3	1.21
Partially skimmed, 44	3.30	0.34	8.31	0.76	25.08	2.57	0.64	4.0	0.99
Average of	3.53	0.31	8.13	0.76	25.08	2.51	0.57	4.4	1.16
Average of	3.58	0.45	8.10	0.77	24.60	2.47	0.60	3.8	1.23
Average of	3.66	0.34	8.15	0.74	23.87	2.50	0.60	4.3	1.19
Average of	3.63	0.36	8.10	0.77	24.44	2.49	0.66	3.8	1.14
	3.63	0.34	8.10	0.74	23.67	2.50	0.60	4.3	1.17

NUMBER OF EXPERIMENTS.	Pounds of fat in 100											
	lbs. of green cheese.	Pounds of caseine and albumen in 100 lbs.	Pounds of water in 100	lbs. of green cheese.	Pounds of fat in 100	lbs. of water-free cheese	Pounds of fat in 100	lbs. of water-free cheese	Pounds of caseine and albumen in 100 lbs.	Pounds of water in 100	lbs. of green cheese.	Pounds of fat in 100
Normal milk, 36, 40	33.10	24.80	35.60	51.4	38.5	1.26	9.64	3.50	2.44	2.61	10.16	10.16
Normal milk, 36, 39	34.90	24.64	34.72	53.4	37.8	1.41	9.69	3.37	2.39	2.70	10.38	10.38
Normal milk, 34	33.87	24.64	35.62	51.8	38.3	1.25	10.33	3.67	2.53	2.61	9.73	9.73
Normal milk, 33, 35	31.74	24.73	34.18	53.8	37.6	1.41	10.10	3.45	2.50	2.73	9.90	9.90
Normal milk, 37	34.68	24.53	31.55	53.0	37.2	1.42	10.17	3.51	2.47	2.71	9.83	9.83
Normal milk, 41, 42	33.69	24.53	37.63	54.1	39.4	1.36	9.90	3.73	2.43	2.60	10.10	10.10
Normal milk, 43	33.61	24.51	33.46	54.6	40.3	1.35	10.30	3.66	2.56	2.64	9.70	9.70
Normal milk, 43	33.75	27.74	39.35	47.4	45.7	1.04	9.35	3.45	2.48	2.73	10.71	10.71
Normal milk, 43	34.19	24.66	34.90	53.5	37.0	1.39	9.95	3.45	2.46	2.73	10.03	10.03
Normal milk, 43	33.66	24.63	37.94	53.3	38.7	1.37	10.03	3.87	2.47	2.61	9.97	9.97
Normal milk, 43	34.05	24.65	35.77	53.7	39.4	1.39	9.93	3.57	2.46	2.71	10.02	10.02
Normal milk, 43	33.44	25.40	38.29	53.5	41.3	1.39	9.86	3.78	2.50	2.77	10.14	10.14
Normal milk, 43	33.60	24.91	36.03	53.5	39.0	1.36	9.93	3.68	2.47	2.75	10.07	10.07

SUMMARY OF RESULTS.

I. Loss of Milk-Constituents in Cheese-making.

1. *Fat.*

a. The actual amount of fat lost in the whey for 100 pounds of milk was fairly uniform under the same conditions of manufacture and was practically independent of the amount of fat in the milk.

b. The average amount of fat lost in the whey, in all the experiments, was 0.34 pounds (a little over five ounces) for 100 pounds of milk, which was about 9.40 per cent of the fat in the milk. In the factory experiments, the average loss was about 8.54 per cent of the fat in the milk; in the station experiments, it was about 10.56 per cent of the fat in the milk.

2. *Caseine and albumen.*

a. The amount of caseine and albumen lost in the whey was quite uniform under all the conditions tried.

b. The average amount of caseine and albumen lost in the whey, in all the July experiments, was about 0.74 pounds (about twelve ounces) for 100 pounds of milk, which was about 24 per cent of the caseine and albumen in the milk.

c. Taking all the milks, the caseine averaged 2.50 pounds and the albumen 0.60 pounds in 100 pounds of milk; for every pound of albumen, there were 4.2 pounds of caseine.

II. Influence of Composition of Milk on Composition of Cheese.

1. *Fat.*

a. In the cheese made from normal milk, the amount of fat in 100 pounds of green cheese varied from about 32 to 36 pounds and averaged about 34 pounds. In the cheese made from milk a little more than one-fourth skimmed, the fat was diminished to 28.75 pounds.

In general, the fat exercised a greater influence upon the composition of the cheese than did any other constituent of the milk.

2. *Caseine and albumen.*

a. In the cheese made from the normal milks, the amount of caseine and albumen in 100 pounds of cheese was a fairly uniform quantity, varying in the green cheese from 24.33 to 24.89 pounds. Skimming the milk increased the per cent of caseine and albumen in the cheese.

3. *Relation of fat to caseine and albumen in cheese as a basis for determining the character of milk.*

a. The results appear to indicate that in cheese made from normal milk containing about 3.5 to 4 pounds of fat in 100 pounds of milk, there should be about 1.3 to 1.4 pounds of fat for one pound of caseine and albumen in the water-free cheese. Partial skimming reduced this ratio to 1.04 pounds.

III. Influence of Composition of Milk on Yield of Cheese.

1. *Fat.*

a. Of the increased yield of cheese obtained in the various experiments, nearly three-fourths of the increase, on an average, was due to an increase of fat in the milk from which the cheese was made.

b. The amount of fat retained in the cheese made from 100 pounds of milk increased when the amount of fat in the milk increased, but not with exact uniformity.

2. *Caseine and albumen.*

a. There was no increase of caseine and albumen in the milk and, hence, no increased yield of cheese due to caseine and albumen.

3. *Water.*

a. About one-twelfth of the increased yield of cheese was due to an increased amount of water retained in the cheese.

b. The amount of water retained in the cheese made from 100 pounds of milk was quite variable and appeared to be dependent upon conditions of manufacture more than upon the composition of the milk.

IV. Yield of Cheese.

1. *Pounds of cheese made from milk.*

a. Of the factory milk there was required, on an average, 10.03 pounds to make one pound of cheese.

b. Of the station milk, 10.04 pounds sufficed to make one pound of cheese.

c. One hundred pounds of factory milk made, on an average, 9.97 pounds of green cheese; 100 pounds of station milk made 9.86 pounds of green cheese.

V. Influence of Variation of Conditions of Manufacture.

1. *Variation in amount of rennet used.*

a. Loss of milk-constituents.—The use of a large amount of rennet was accompanied by a little larger loss of fat.

b. Yield.—The yield was slightly greater with the larger amount of rennet, owing to retention of water.

2. *Cutting curd in hard and soft condition.*

a. Loss of milk-constituents.—Hard cutting gave less loss of fat.

b. Yield.—The soft cutting gave a little larger yield, owing largely to retention of more moisture.

3. *Comparison of stirred-curd and Cheddar processes.*

a. Loss of milk-constituents.—The results were not uniform.

b. Yield.—In one case the Cheddar process gave a greater yield than, and, in the other, the same yield as, the stirred-curd process.

4. *Influence of tainted milk.*

a. Loss of milk-constituents.—The loss of fat was increased from 0.3 to 0.5 pounds for 100 pounds of milk. The loss of caseine was not materially increased.

b. Yield.—The yield was diminished.

c. Quality.—The flavor was imperfect and the texture loose.

**CHEESE INVESTIGATION AND EXPERIMENTS FOR
AUGUST.**

The only new variation introduced into the experiments of August was for the purpose of testing the effect of cutting the curd less fine than usual in one trial.

ANALYSIS OF MILK, WHEY AND CHEESE.

AUGUST, 1892.	COMPOSITION EXPRESSED IN PARTS PER HUNDRED.							FROM ONE HUNDRED POUNDS OF MILK.							
	Per cent of water.	Per cent of total solids.	Per cent of fat.	Per cent of caseine and albumen.	Per cent of caseine.	Per cent of albumen.	Per cent of sugar, ash, etc.	Pounds.	Pounds of water.	Pounds of total solids.	Pounds of fat.	Pounds of caseine and albumen.	Pounds of caseine.	Pounds of albumen.	Pounds of sugar, ash, etc.
No. 45—August 2:															
Milk	87.26	12.74	3.80	3.01	2.46	0.55	5.93	Milk	100	87.26	12.74	3.80	3.01	2.46	5.93
Whey	93.03	6.97	0.40	0.80	23.04	2.25	5.77	Whey	90.40	84.10	6.80	0.36	0.72	2.46	5.22
Green cheese	93.50	66.50	36.64	25.29	23.04	2.25	4.57	Cheese	9.60	3.22	6.88	3.52	2.43	2.21	0.43
No. 46—August 2:															
Milk	87.49	12.51	3.60	3.01	2.45	0.56	5.90	Milk	100	87.49	12.51	3.60	3.01	2.45	5.90
Whey	93.14	6.86	0.38	0.82	23.61	1.90	5.66	Whey	90.60	84.38	6.22	0.34	0.74	2.45	5.14
Green cheese	93.96	66.04	35.36	25.51	23.61	1.90	5.17	Cheese	9.40	3.19	6.21	3.32	2.40	2.22	0.49
No. 47—August 3:															
Milk	87.65	12.35	3.50	3.00	2.45	0.55	5.85	Milk	100	87.65	12.35	3.50	3.00	2.45	5.85
Whey	93.22	6.78	0.36	0.80	21.72	1.65	5.62	Whey	89.80	83.71	6.09	0.32	0.72	2.45	5.05
Green cheese	93.51	61.49	32.67	23.37	21.72	1.65	5.45	Cheese	10.20	3.93	6.27	3.33	2.38	2.22	0.56
No. 48—August 3:															
Milk	87.04	12.96	4.00	3.06	2.49	0.59	5.88	Milk	100	87.04	12.96	4.00	3.06	2.49	5.88
Whey	93.19	6.81	0.32	0.81	21.66	1.52	5.68	Whey	89.40	83.31	6.09	0.29	0.72	2.49	5.08
Green cheese	93.12	63.86	35.65	23.18	21.66	1.52	5.05	Cheese	10.60	3.83	6.77	3.73	2.46	2.30	0.53
No. 49—August 4:															
Milk	87.28	12.72	3.90	3.05	2.46	0.63	5.78	Milk	100	87.28	12.72	3.90	3.05	2.46	5.78
Whey	93.10	6.90	0.41	0.82	23.72	1.34	5.67	Whey	89.90	83.70	6.20	0.37	0.73	2.46	5.10
Green cheese	93.17	63.83	35.47	24.56	23.72	1.34	5.33	Cheese	10.10	3.65	6.45	3.58	2.48	2.29	0.39
No. 50—August 4:															
Milk	87.39	12.71	3.76	3.05	2.47	0.58	5.91	Milk	100	87.39	12.71	3.76	3.05	2.47	5.91
Whey	92.92	7.08	0.39	0.83	23.60	1.52	5.96	Whey	89.90	83.54	6.36	0.36	0.75	2.47	5.35
Green cheese	93.17	63.83	35.02	24.12	23.60	1.52	4.69	Cheese	10.10	3.65	6.45	3.54	2.43	2.28	0.47
No. 51—August 4:															
Milk	87.17	12.83	3.85	3.03	2.47	0.56	5.95	Milk	100	87.17	12.83	3.85	3.03	2.47	5.95
Whey	93.05	6.95	0.32	0.81	21.01	2.66	5.82	Whey	89.82	83.59	6.24	0.29	0.73	2.47	5.23
Green cheese	93.76	64.24	35.16	23.67	21.01	2.66	5.41	Cheese	10.18	3.64	6.54	3.53	2.40	2.13	0.56

No. 52—August 4:	Milk	87.23	12.77	3.95	3.29	2.49	0.80	5.53	Milk	100	87.23	12.77	3.95	3.29	2.49	0.80	5.53
	Whey	93.00	7.00	0.45	0.89	.....	.....	5.66	Whey	89.40	83.14	6.26	0.40	0.80	.....	.....	5.06
	Green cheese	86.12	63.88	33.91	24.19	23.01	1.18	5.78	Cheese	10.60	3.88	6.77	3.59	2.55	2.44	0.12	0.62
No. 53—August 23:	Milk	87.23	12.77	3.95	3.29	2.49	0.80	5.53	Milk	100	87.23	12.77	3.95	3.29	2.49	0.80	5.53
	Whey	93.06	6.94	0.32	0.91	.....	.....	5.71	Whey	89.30	83.10	6.20	0.39	0.81	.....	.....	5.10
	Green cheese	87.23	62.77	33.53	24.27	23.14	1.13	4.97	Cheese	10.70	3.98	6.72	3.59	2.60	2.48	0.12	0.53
No. 54—August 24:	Milk	87.23	12.77	4.00	3.27	2.49	0.78	5.50	Milk	100	87.23	12.77	4.00	3.27	2.49	0.78	5.50
	Whey	93.00	7.00	0.33	0.90	.....	.....	5.72	Whey	89.30	83.05	6.25	0.34	0.80	.....	.....	5.11
	Green cheese	86.42	61.58	34.44	23.54	21.63	1.91	3.60	Cheese	10.70	4.11	6.59	3.68	2.52	2.31	0.21	0.39
No. 55—August 24:	Milk	87.23	12.77	4.00	3.27	2.49	0.78	5.50	Milk	100	87.23	12.77	4.00	3.27	2.49	0.78	5.50
	Whey	92.98	7.02	0.34	0.89	.....	.....	5.79	Whey	89.30	83.08	6.27	0.30	0.79	.....	.....	5.18
	Green cheese	86.45	61.55	34.73	23.67	21.82	1.85	3.15	Cheese	10.70	4.11	6.50	3.72	2.53	2.33	0.20	0.34
No. 56—August 25:	Milk	87.14	12.86	3.95	3.25	2.53	0.72	5.66	Milk	100	87.14	12.86	3.95	3.25	2.53	0.72	5.66
	Whey	93.10	6.90	0.24	0.87	.....	.....	5.79	Whey	89.30	83.14	6.16	0.21	0.78	.....	.....	5.17
	Green cheese	87.39	62.61	35.06	22.77	21.70	1.07	4.78	Cheese	10.70	4.00	6.70	3.75	2.44	2.32	0.11	0.51
No. 57—August 25: *	Milk	87.77	12.23	3.25	3.27	2.60	0.67	5.71	Milk	100	87.77	12.23	3.25	3.27	2.60	0.67	5.71
	Whey	93.10	6.90	0.25	0.90	.....	.....	5.75	Whey	90.20	83.98	6.22	0.23	0.81	.....	.....	5.18
	Green cheese	87.85	62.15	31.63	23.26	25.04	1.22	4.21	Cheese	9.80	3.71	6.09	3.10	2.57	2.45	0.12	0.43
No. 58—August 26:	Milk	87.07	12.93	4.00	3.23	2.57	0.66	5.70	Milk	100	87.07	12.93	4.00	3.23	2.57	0.66	5.70
	Whey	93.03	6.97	0.22	0.89	.....	.....	5.86	Whey	88.75	82.6	6.19	0.20	0.79	.....	.....	5.20
	Green cheese	89.53	60.47	33.60	22.33	20.90	1.43	4.54	Cheese	11.25	4.45	6.80	3.78	2.51	2.35	0.16	0.51
No. 59—August 26:	Milk	87.07	12.93	4.00	3.23	2.57	0.66	5.70	Milk	100	87.07	12.93	4.00	3.23	2.57	0.66	5.70
	Whey	93.07	6.93	0.22	0.87	.....	.....	5.84	Whey	88.75	82.60	6.15	0.20	0.77	.....	.....	5.18
	Green cheese	83.77	60.23	33.48	23.36	20.98	1.38	4.39	Cheese	11.25	4.47	6.78	3.77	2.52	2.36	0.16	0.49
No. 60—August 27:	Milk	87.10	12.90	4.10	3.17	2.54	0.63	5.63	Milk	100	87.10	12.90	4.10	4.17	2.54	0.63	5.63
	Whey	93.23	6.77	0.30	0.85	.....	.....	5.62	Whey	88.70	82.70	6.00	0.27	0.75	.....	.....	4.98
	Green cheese	89.34	60.66	34.42	22.26	20.86	1.42	3.96	Cheese	11.30	4.45	6.85	3.89	2.52	2.86	0.16	0.44
No. 61—August 27:	Milk	87.10	12.90	4.10	3.17	2.54	0.63	5.63	Milk	100	87.10	12.90	4.10	3.17	2.54	0.63	5.63
	Whey	93.34	6.66	0.26	0.85	.....	.....	5.55	Whey	88.60	82.70	5.90	0.23	0.75	.....	.....	4.92
	Green cheese	89.08	60.92	34.37	22.88	20.67	1.71	4.17	Cheese	11.40	4.46	6.94	3.92	2.55	2.36	0.19	0.47

* Partially skimmed.

TABULATED STATEMENT OF THE PRINCIPAL CONDITIONS OF MANUFACTURE.

NUMBER OF EXPERIMENT.	Date.	Kind of cheese made.	Pounds of milk used.	Pounds of green cheese made.	Temperature of milk when rennet was added.	Ounces of rennet extract used per 1,000 pounds of milk.	Time required for milk to begin to thicken.	Time from adding rennet to cutting curd.	Condition of curd when cut.	Temperature used in heating curd after cutting.	Time taken to heat to 98° F. or more.	Time from reaching required temperature to drawing whey.	Time from drawing whey to salting.	Ounces of salt used for each pound of fat in milk.	Time from salting to putting to press.	H. Min.	Time of whole operation.
45	1892. Aug. 2	Cheddar.....	4,017	385.5	84	2	27	40	Ordinary.....	100	60	120	270	1.09	10	9	40
46	Aug. 2	Stirred-curd.....	4,189	393.5	84	2	22	30	Ordinary.....	98	55	100	30	1.22	240	8	25
47	Aug. 3	Cheddar.....	3,968	421.5	84	3	17	22	Ordinary.....	98	65	84	168	1.28	10	6	35
48	Aug. 3	Cheddar.....	3,969	407.5	84	3	17	23	Ordinary.....	98	55	65	165	1.04	10	7	00
49	Aug. 4	Cheddar.....	4,322	437.0	84	2 1/2	21	27	Soft.....	99	80	40	120	1.07	15	6	00
50	Aug. 4	Cheddar.....	4,151	420.0	84	2 1/2	20	27	Hard.....	99	54	29	135	1.11	15	6	04
51	Aug. 4	Cheddar.....	3,712	378.0	84	5	11	15	Ordinary.....	98	73	80	150	1.08	15	6	46
52	Aug. 23	Stirred-curd.....	250	26.50	82	3	20	30	Ordinary.....	98	61	99	21	1.11	94	6	35
53	Aug. 23	Cheddar.....	250	26.75	82	3	19	31	Ordinary.....	98	58	77	145	1.02	10	9	55
54	Aug. 24	Cheddar.....	250	26.75	82	3	10	35	Hard.....	99	38	55	65	1.00	10	4	15
55	Aug. 24	Cheddar.....	250	26.75	82	3	10	26	Soft.....	99	40	60	60	1.00	15	4	10
56	Aug. 25	Cheddar.....	250	26.75	82	3	14	23	Ordinary.....	99	50	85	115	1.02	10	5	35
57	Aug. 25	Cheddar.....	237.3	21.50	84	3	14	21	Ordinary.....	98	55	75	130	1.05	10	5	40
58	Aug. 26	Cheddar.....	242	27.25	86	4	11	31	Hard & coarse	102	39	149	60	1.00	10	5	15
59	Aug. 26	Cheddar.....	242	27.25	86	4	10	30	Soft & coarse.	99	49	96	100	1.00	10	5	05
60	Aug. 27	Cheddar.....	230	26.00	82	3	11	21	Ordinary.....	99	50	80	87	0.90	10	4	50
61	Aug. 27	Cheddar.....	230	26.25	82	6	6	11	Ordinary.....	99	50	60	100	0.90	10	4	45

Statement of Results.

1. Time required for milk to begin to thicken after addition of rennet.

a. Factory experiments.—The time varied from eleven to twenty-seven minutes and averaged about nineteen minutes.

b. Station experiments.—The time varied from six to twenty minutes, and averaged twelve and one-half minutes.

2. Time from adding rennet to cutting curd.

a. Factory experiments.—The time varied from fifteen to forty minutes, and averaged about twenty-six minutes.

b. Station experiments.—The time varied from eleven to thirty-five minutes, and averaged twenty minutes.

3. Time required to heat to ninety-eight degrees F., or more after cutting and stirring curd.

a. Factory experiments.—The time varied from fifty-five to eighty minutes, and averaged about sixty-three minutes.

b. Station experiments.—The time varied from thirty-eight to sixty-one minutes, and averaged about forty-nine minutes.

4. Time from reaching ninety-eight degrees F., or more, to drawing whey.

a. Factory experiments.—The time varied from twenty-nine to 120 minutes, and averaged sixty-seven minutes.

b. Station experiments.—The time varied from fifty-five to 149 minutes, and averaged eighty-four minutes.

5. Time from drawing whey to salting curd.

a. Factory experiments.—The time varied from 120 to 270 minutes, in the Cheddar process, averaging 168 minutes; in the stirred-curd process the time was thirty minutes.

b. Station experiments.—The time varied from sixty to 145 minutes, and averaged ninety-six minutes in the Cheddar process; in the stirred-curd process, the time was twenty-one minutes.

6. Time occupied by the whole operation of cheese-making.

a. Factory experiments.—The time varied from six hours to nine hours and forty minutes, and averaged about seven hours and fifteen minutes.

b. Station experiments.—The time varied from four hours and

ten minutes to six hours and fifty-five minutes, and averaged about five hours and twenty minutes.

For explanation of data in the various tables following, see "Cheese Investigation and Experiments for May," in this report.

LOSS OF MILK-CONSTITUENTS IN CHEESE-MAKING.

Amount of Fat Recovered and Lost in Cheese-making.

TABLE SHOWING AMOUNT OF FAT RECOVERED AND LOST IN CHEESE-MAKING.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 pounds of milk.	Pounds of fat lost in whey for 100 pounds of milk.	Pounds of fat recovered in cheese for 100 pounds of milk.	Per cent of fat in milk lost in whey.	Per cent of fat in milk recovered in cheese.
47	3.50	0.32	3.18	9.14	90.86
46	3.60	0.34	3.26	9.44	90.56
50	3.75	0.26	3.49	6.93	93.07
45	3.80	0.36	3.44	9.47	90.03
51	3.85	0.29	3.56	7.53	92.47
49	3.90	0.37	3.53	9.49	90.51
48	4.00	0.29	3.71	7.25	92.75
57*	3.25	0.23	3.02	7.08	92.92
52	3.95	0.40	3.55	10.13	89.87
53	3.95	0.29	3.66	7.34	92.66
56	3.9	0.21	3.74	5.32	94.68
54	4.00	0.34	3.66	8.50	91.50
55	4.00	0.30	3.70	7.50	92.50
58	4.00	0.20	3.80	5.00	95.00
59	4.00	0.20	3.80	5.00	95.00
60	4.10	0.27	3.83	6.58	93.42
61	4.10	0.23	3.87	5.61	94.39

Statement of Results.

1. Pounds of fat in 100 pounds of milk.

a. Factory experiments.—The milk fat varied from 3.50 to 4.00 pounds in 100 pounds of milk, and averaged 3.77 pounds.

b. Station experiments.—The milk fat varied from 3.25 to 4.10 pounds of fat in 100 pounds of milk, and averaged 3.94

* Partially skimmed.

pounds; or, if we exclude the skim-milk, the variation of fat was from 3.95 to 4.10 pounds in the station milks that were normal, the average of fat being 4.00 pounds.

2. Pounds of fat lost for 100 pounds of milk.

a. Factory experiments.—The amount of fat lost in the whey varied from 0.26 to 0.37 pounds for each 100 pounds of milk and averaged 0.32 pounds.

b. Station experiments.—In the ten experiments, the loss of fat varied from 0.21 to 0.34 pounds for each 100 pounds of milk, and averaged 0.27 pounds.

3. Per cent of fat in milk lost in whey.

a. Factory experiments.—The per cent of milk fat that was lost varied from 6.93 to 9.44 per cent, and averaged 8.50 per cent of the fat in the milk.

b. Station experiments.—The per cent of milk fat lost varied from 5.00 to 10.13 per cent, and averaged 6.75 per cent of the fat in the milk.

4. Comparison of stirred-curd and Cheddar processes with reference to loss of fat.

a. Factory experiments.—In experiment 45 the Cheddar process was employed, and in experiment 46, made the same day, the stirred-curd process was used. The loss of fat was practically the same in both cases.

b. Station experiments.—In experiment 52 the stirred-curd process was used; in 53 the Cheddar process. A considerably larger loss of fat occurred in the stirred-curd process.

5. Influence of cutting curd in hard and soft condition upon loss of fat.

a. Factory experiments.—In experiment 50 the curd was cut hard; in experiment 49 it was cut soft. The proportion of fat lost was greater in case of the soft cutting, being as 9.49 to 6.43 per cent of the fat in the milk.

b. Station experiments.—In experiment 54 the curd was cut hard; in 55 soft. The loss was noticeably but not seriously greater in case of the hard-cut curd, being as 8.50 to 7.50 per cent of the fat in the milk.

6. Influence of using different amounts of rennet upon loss of fat.

a. Factory experiments.—In experiment 51 five ounces of rennet extract were used, about twice as much as in the other factory experiments. The loss of fat was less than the average of the other factory experiments.

b. Station experiments.—In experiment 60 three ounces of rennet were used; in 61 six ounces. The loss of fat was slightly less when the larger amount of rennet was used.

7. Influence of cutting curd coarse and soft, and coarse and hard upon loss of fat.

In experiment 58 the curd was cut hard and considerably coarser than usual; in 59 the curd was cut soft and equally coarse as in 58. As between the soft and hard cutting there was no difference as to the amount of fat lost.

The coarse cutting, as compared with the other experiments in which the curd was cut finer, showed less loss of fat.

General Summary.

Grouping together the different experiments in which milks of similar composition were used and averaging the results, we obtain the following table:

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of fat lost in whey for 100 lbs. of milk.	Pounds of fat re- covered in cheese for 100 lbs. of milk.	Per cent of fat in milk lost in whey.	Per cent of fat in milk recovered in cheese.
57*	3.25	0.23	3.02	7.08	92.92
47	3.50	0.32	3.18	9.14	90.86
46	3.60	0.34	3.26	9.44	90.56
50	3.75	0.26	3.49	6.93	93.07
45	3.80	0.36	3.44	9.47	90.53
51	3.85	0.29	3.56	7.53	92.47
49	3.90	0.37	3.53	9.49	90.51
52, 53, 56	3.95	0.30	3.65	7.60	92.40
48, 54, 55, 58, 59	4.00	0.27	3.73	6.75	93.25
60, 61	4.10	0.25	3.85	6.10	93.90

* Partially skimmed.

Taking all the milks used in the seventeen August experiments, the average amount of fat in 100 pounds of milk was 3.87 pounds; of this fat, about 0.29 pounds (a little over four and one-half ounces) or 7.50 per cent of the fat in the milk, were lost in the whey for each hundred pounds of milk, while 3.58 pounds of fat were recovered in the cheese. The difference in the loss of fat between the highest and lowest amounts was about three ounces of fat for each hundred pounds of milk.

Amount of Caseine and Albumen Recovered and Lost in Cheese-Making.

TABLE SHOWING AMOUNT OF CASEINE AND ALBUMEN RECOVERED AND LOST IN CHEESE-MAKING.

NUMBER OF EXPERIMENT.	Pounds of caseine and albumen in 100 pounds of milk.	Pounds of caseine and albumen lost in whey for 100 pounds of milk	Pounds of caseine and albumen recovered in cheese for 100 pounds of milk.	Per cent of caseine and albumen in milk lost in whey.	Per cent of caseine and albumen in milk recovered in cheese.
47	3.00	0.72	2.28	24.00	76.00
46	3.01	0.74	2.27	24.58	75.42
50	3.05	0.75	2.30	24.59	75.41
45	3.01	0.72	2.29	23.92	76.08
51	3.03	0.73	2.30	24.10	75.90
49	3.09	0.73	2.36	23.62	76.38
48	3.08	0.72	2.36	23.38	76.62
57	3.27	0.81	2.46	24.77	75.23
52	3.29	0.80	2.49	24.32	75.68
53	3.29	0.81	2.48	24.62	75.38
56	3.25	0.78	2.47	24.00	76.00
54	3.27	0.80	2.47	24.46	75.54
55	3.27	0.79	2.48	24.16	75.84
58	3.23	0.79	2.44	24.46	75.54
59	3.23	0.77	2.46	23.84	76.16
60	3.17	0.75	2.42	23.66	76.34
61	3.17	0.75	2.42	23.66	76.34

Statement of Results.

1. Pounds of caseine and albumen in 100 pounds of milk.

a. Factory experiments.—The amount of caseine and albumen in the milk varied from 3.00 to 3.09 pounds in 100 pounds of milk, and averaged 3.04 pounds.

b. Station experiments.—The amount of caseine and albumen in the milk varied from 3.17 to 3.29 pounds in 100 pounds of milk, and averaged 3.24 pounds.

2. Pounds of caseine and albumen lost for 100 pounds of milk.

a. Factory experiments.—The amount of caseine and albumen lost in the whey varied from 0.72 to 0.75 pounds for each hundred pounds of milk, and averaged 0.73 pounds.

b. Station experiments.—The amount of caseine and albumen lost in the whey varied from 0.75 to 0.80 pounds and averaged 0.79 pounds for 100 pounds of milk.

3. Per cent of caseine and albumen in milk lost in whey.

a. Factory experiments.—The per cent of caseine and albumen that was lost varied from 23.38 to 24.59 per cent of the caseine and albumen in the milk, and averaged 24.00.

b. Station experiments.—The per cent of caseine and albumen lost varied from 23.66 to 24.77 per cent of the caseine and albumen in the milk, with an average of 24.38 per cent.

4. Variations and conditions of manufacture, such as using Cheddar and stirred-curd processes, varying the amount of rennet, cutting curd soft and hard, and skimming milk, appeared to influence very little, if at all, the amount of caseine and albumen lost in the whey.

5. General summary.

Taking all the August experiments, the amount of caseine and albumen averaged 3.16 pounds in 100 pounds of milk; of this amount, about 0.76 pounds (about 12 ounces), or about 24 per cent of the caseine and albumen in the milk, were lost in the whey for each 100 pounds of milk, while 2.40 pounds were recovered in the cheese. From the season's experiments it would appear as if the proportion of caseine and albumen lost were quite uniform, being about 24 per cent of the amount present in the milk, and this loss is not much influenced by variation of conditions of manufacture, so far as we have yet experimented.

Relation of Caseine to Albumen in Milk.

TABLE SHOWING RELATION OF CASEINE TO ALBUMEN IN MILK.

NUMBER OF EXPERI- MENT.	Pounds of caseine and albumen in 100 lbs. of milk.	Pounds of caseine in 100 lbs. of milk.	Pounds of albu- men in 100 lbs. of milk.	Pounds of caseine for 100 lbs. of caseine and albu- men.	Pounds of albu- men for 100 lbs. of caseine and al- bumen.	Pounds of caseine for one lb. of al- bumen in milk.
47.....	3.00	2.45	0.55	81.67	18.33	4.5
46.....	3.01	2.45	0.56	81.39	18.61	4.4
50.....	3.05	2.47	0.58	81.00	19.00	4.3
45.....	3.01	2.46	0.55	81.73	18.27	4.5
51.....	3.03	2.47	0.56	81.52	18.48	4.4
49.....	3.09	2.46	0.63	79.60	20.40	3.9
48.....	3.08	2.49	0.59	80.84	19.16	4.2
57.....	3.27	2.60	0.67	79.51	20.49	3.9
52.....	3.29	2.49	0.80	75.70	24.30	3.1
53.....	3.29	2.49	0.80	75.70	24.30	3.1
56.....	3.25	2.53	0.72	77.80	22.20	3.5
54.....	3.27	2.49	0.78	76.15	23.85	3.2
55.....	3.27	2.49	0.78	76.15	23.85	3.2
58.....	3.23	2.57	0.66	79.57	20.43	3.9
59.....	3.23	2.57	0.66	79.57	20.43	3.9
60.....	3.17	2.54	0.63	80.12	19.88	4.0
61.....	3.17	2.54	0.63	80.12	19.88	4.0

Statement of Results.

1. Pounds of caseine and albumen in 100 pounds of milk.

a. Factory experiments.— The amount of caseine and albumen averaged 3.04 pounds.

b. Station experiments.— The amount of caseine and albumen averaged 3.24 pounds.

2. Pounds of caseine in 100 pounds of milk.

a. Factory experiments.— The caseine varied from 2.45 to 2.49 pounds, and averaged 2.46 pounds in 100 pounds of milk.

b. Station experiments.— The caseine varied from 2.49 to 2.60 pounds, and averaged 2.53 pounds in 100 pounds of milk.

3. Pounds of albumen in 100 pounds of milk.

a. Factory experiments.— The amount of albumen varied from 0.55 to 0.63 pounds, and averaged 0.58 pounds in 100 pounds of milk.

b. Station experiments.— The albumen varied from 0.63 to 0.80 pounds, and averaged about 0.71 pounds in 100 pounds of milk.

4. Pounds of caseine for one pound of albumen in milk.
- a. Factory experiments.—For each pound of albumen in the milk, the caseine varied from 3.9 pounds to 4.5 pounds, with an average of 4.2 pounds.
- b. Station experiments.—For each pound of albumen in the milk, the caseine varied from 3.1 pounds to 4 pounds, with an average of 3.6 pounds.

7. General summary:

In all of the experiments, the average amount of caseine and albumen was 3.16 pounds for 100 pounds of milk; of this amount about 2.50 pounds, or 79.1 per cent consisted of caseine, while about 0.66 pounds, or 20.9 per cent, consisted of albumen. There were, on an average, about 3.8 pounds of caseine to one pound of albumen.

INFLUENCE OF COMPOSITION OF MILK ON COMPOSITION OF CHEESE.

Influence of Fat in Milk on Composition of Cheese.
TABLE SHOWING RELATION OF FAT IN MILK TO FAT IN CHEESE.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of fat in 100 lbs. of water- free cheese.	Pounds of fat in 100 lbs. of water- free cheese for one lb. of fat in milk.
47	3.50	53.1	15.2
46	3.60	53.5	14.9
50	3.75	54.9	14.6
45	3.80	55.1	14.5
51	3.85	54.7	14.2
49	3.90	55.6	14.3
48	4.00	55.8	14.0
57*	3.25	51.0	15.7
52	3.95	53.1	13.5
53	3.95	53.4	13.5
56	3.95	56.0	14.2
54	4.00	55.9	14.0
55	4.00	56.4	14.1
58	4.00	55.6	13.9
59	4.00	55.6	13.9
60	4.10	56.7	13.8
61	4.10	56.4	13.8

* Partially skimmed.

Statement of Results.

1. Amount of fat, in 100 pounds of milk.

a. Factory experiments.—The fat varied from 3.50 to 4.00 pounds, and averaged 3.77 pounds in 100 pounds of milk.

b. Station experiments.—The fat varied from 3.25 to 4.10 pounds, and averaged 3.94 pounds in 100 pounds of milk.

2. Amount of fat in 100 pounds of water-free cheese.

a. Factory experiments.—The fat varied from 53.1 to 55.8 pounds, and averaged 54.7 pounds in 100 pounds of water-free cheese.

b. Station experiments.—The fat varied from 51 to 56.7 pounds, and averaged 55 pounds in 100 pounds of water-free cheese.

3. Pounds of fat in 100 pounds of cheese for one pound of fat in milk.

a. Factory experiments.—For each pound of fat in milk there were in 100 pounds of cheese from 14 to 15.2 pounds of fat with an average of 14.5 pounds.

b. Station experiments.—For each pound of fat in milk, there were in 100 pounds of cheese from 13.5 to 15.7 pounds of fat, with an average of 14 pounds.

Influence of Caseine and Albumen in Milk on Composition of Cheese.

TABLE SHOWING RELATION OF CASEINE AND ALBUMEN IN MILK
TO CASEINE AND ALBUMEN IN CHEESE.

NUMBER OF EXPERIMENT.	Pounds of caseine and albumen in 100 lbs. of milk.	Pounds of caseine and albumen in 100 lbs. of water-free cheese.	Pounds of caseine and albumen in water free cheese for one pound of fat in milk.	Pounds of fat for one pound of caseine and albumen in milk.
47	3.00	38.0	12.7	1.17
46	3.01	38.8	12.2	1.20
50	3.05	37.8	12.4	1.23
45	3.01	38.0	12.6	1.26
51	3.03	36.8	12.1	1.27
49	3.09	38.5	12.4	1.26
48	3.08	36.3	11.8	1.30
57*	3.27	42.2	12.9	0.99
52	3.29	37.9	11.5	1.20
53	3.29	38.7	11.8	1.20
56	3.25	36.4	11.2	1.22
54	3.27	38.2	11.7	1.22
55	3.27	38.5	11.8	1.22
58	3.23	36.9	11.4	1.24
59	3.23	37.1	11.5	1.24
60	3.17	36.7	11.6	1.2
61	3.17	36.7	11.6	1.29

Statement of Results.

1. Pounds of caseine and albumen in 100 pounds of milk.

a. Factory experiments.—The amount of caseine and albumen varied from 3.00 to 3.09 pounds, and averaged 3.04 pounds in 100 pounds of milk.

b. Station experiments.—The amount of caseine and albumen varied from 3.17 to 3.29 pounds, and averaged 3.24 pounds.

2. Pounds of caseine and albumen in 100 pounds of water-free cheese.

a. Factory experiments.—The amount of caseine and albumen varied from 36.3 to 38.8 pounds in 100 pounds of water-free cheese, and averaged 37.7 pounds.

b. Station experiments.—The amount of caseine and albumen in 100 pounds of water-free cheese varied from 36.4 to 42.2 pounds, and averaged 37.9 pounds.

* Partially skimmed.

3. Pounds of caseine and albumen in 100 pounds of cheese for one pound of caseine and albumen in milk.

a. Factory experiments.—The ratio varied from 11.8 to 12.7, and averaged 12.4.

b. Station experiments.—The ratio varied from 11.2 to 11.8 for normal milks, or from 11.2 to 12.9 for all, and averaged 11.7.

4. Pounds of fat for one pound of caseine and albumen in milk.

a. Factory experiments.—There were from 1.17 to 1.30 pounds of fat in the milk for each pound of caseine and albumen, with an average of 1.24 pounds.

b. Station experiments.—In the normal milks, the fat varied from 1.20 to 1.29 pounds for each pound of caseine and albumen in the milk, and averaged 1.25. In the milk that was partially skimmed, the fat was about the same in amount as the caseine and albumen.

Relation of Fat to Caseine and Albumen in Cheese as a Basis for Determining the Character of Milk.

TABLE SHOWING RELATION OF FAT TO CASEINE AND ALBUMEN IN CHEESE.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of fat in 100 lbs. of water- free cheese.	Pounds of caseine and albumen in 100 lbs. of water- free cheese.	Pounds of fat for one lb. of caseine and albumen in water-free cheese.
47	3.50	53.1	38.0	1.40
46	3.60	53.5	38.8	1.38
50	3.75	54.9	37.8	1.45
45	3.80	55.1	38.0	1.45
51	3.85	54.7	36.8	1.48
49	3.90	55.6	38.5	1.44
48	4.00	55.8	36.3	1.54
57*	3.25	51.0	42.2	1.21
52	3.95	53.1	37.9	1.40
53	3.95	53.4	38.7	1.38
56	3.95	56.0	36.4	1.54
54	4.00	55.9	38.2	1.46
55	4.00	56.4	38.5	1.46
58	4.00	55.6	36.9	1.50
59	4.00	55.6	37.1	1.50
60	4.10	56.7	36.7	1.54
61	4.10	56.4	36.7	1.54

* Partially skimmed.

Statement of Results.

a. Factory experiments.—For each pound of caseine and albumen in the water-free cheese, there were from 1.38 to 1.54 pounds of fat, with an average of 1.45 pounds.

b. Station experiments.—The fat varied from 1.38 to 1.54 pounds, and averaged 1.48 pounds for each pound of caseine and albumen in the cheese, when the milk was normal. In experiment 57, when the milk was about one-fourth skimmed, the amount of fat dropped to 1.21 pounds for a pound of caseine and albumen in the cheese.

INFLUENCE OF COMPOSITION OF MILK ON YIELD OF CHEESE.
TABLE SHOWING RELATION OF MILK-CONSTITUENTS TO YIELD OF CHEESE.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of caseine and albumen in 100 lbs. of milk.	Pounds of green cheese made from 100 lbs. of milk.	Pounds of water in cheese made from 100 lbs of milk.	Pounds of fat in cheese made from 100 lbs of milk.	Pounds of caseine and albumen in cheese made from 100 lbs. of milk.	Pounds of sugar, ash, etc., in cheese made from 100 lbs. of milk.
47.....	3.50	3.00	10.20	3.93	3.33	2.38	0.56
46.....	3.60	3.01	9.40	3.19	3.32	2.40	0.49
50.....	3.75	3.05	10.10	3.65	3.54	2.43	0.47
45.....	3.80	3.01	9.60	3.22	3.52	2.43	0.43
51.....	3.85	3.03	10.18	3.64	3.58	2.40	0.56
49.....	3.90	3.09	10.10	3.65	3.58	2.48	0.39
48.....	4.00	3.08	10.60	3.83	3.78	2.46	0.53
57*.....	3.25	3.27	9.80	3.71	3.10	2.57	0.42
52.....	3.95	3.29	10.60	3.83	3.59	2.56	0.62
53.....	3.95	3.29	10.70	3.98	3.59	2.60	0.53
56.....	3.95	3.25	10.70	4.00	3.75	2.44	0.51
54.....	4.00	3.27	10.70	4.11	3.68	2.52	0.39
55.....	4.00	3.27	10.70	4.11	3.72	2.53	0.34
58.....	4.00	3.23	11.25	4.45	3.78	2.51	0.51
59.....	4.00	3.23	11.25	4.47	3.77	2.52	0.49
60.....	4.10	3.17	11.30	4.45	3.89	2.52	0.44
61.....	4.10	3.17	11.40	4.46	3.92	2.55	0.47

* Partially skimmed.

Yield of Green Cheese from 100 Pounds of Milk.

Statement of Results.

- 1. Pounds of cheese made from 100 pounds of milk.
 - a. Factory experiments.—The yield of cheese from 100 pounds of milk varied from 9.40 to 10.60 pounds, and averaged 10.03 pounds.
 - b. Station experiments.—The yield varied from 9.80 to 11.40 pounds, and averaged 10.84 pounds. Omitting the experiment in which skim-milk was used, the variation was from 10.60 to 11.40, with an average of 10.96 pounds.
- 2. Influence of stirred-curd and Cheddar processes upon yield of cheese.

NUMBER OF EXPERIMENT.	Process.	Pounds of cheese made from 100 lbs. of milk.
45.....	Cheddar	9.60
46.....	Stirred-curd	9.40
53.....	Cheddar	10.70
52.....	Stirred-curd	10.60

In one case the Cheddar process made 0.20 pounds more cheese than the stirred-curd process, but this was due entirely to difference in composition of the milk; and, therefore, the yield was practically the same in both cases. In experiments 52 and 53, when the same kind of milk was used in both cases, the yield by the Cheddar process was 0.10 pounds higher.

- 3. Influence of skimming milk upon yield of cheese.

NUMBER OF EXPERIMENT.	Kind of milk.	Pounds of cheese made from 100 lbs. of milk.	Pounds of fat in 100 lbs. of milk.
57.....	Skimmed	9.80	3.25
56.....	Whole-milk	10.70	3.95

The removal of 0.70 pounds of fat from the milk was accompanied by a reduction of 0.90 pounds in yield.

Amount of Water Retained in Cheese made from 100 Pounds of Milk.

1. Average of results.

Taking all the experiments of August, the water retained in the cheese made from 100 pounds of milk varied from 3.19 to 4.47 pounds, and averaged 3.92 pounds. Some of the more marked variations were due to especial conditions of manufacture, which we will now examine.

2. Influence of stirred-curd and Cheddar processes upon amount of water retained in cheese.

NUMBER OF EXPERIMENT.	Process.	Pounds of water in cheese made from 100 lbs. of milk.
45.....	Cheddar	3.22
46.....	Stirred-curd	3.19
53.....	Cheddar	3.98
52.....	Stirred-curd	3.83

In both cases the Cheddar process retained more water. The amount varying from 0.03 to 0.15 pounds.

3. Influence of cutting curd in hard and soft condition upon amount of water retained in cheese.

NUMBER OF EXPERIMENT.	Condition of curd when cut.	Pounds of water in cheese made from 100 lbs. of milk.
50.....	Hard	3.65
49.....	Soft	3.65
54.....	Hard	4.11
55.....	Soft	4.11

In both cases, the hard-cut curd retained the same amount of moisture as the soft-cut curd.

4. Influence of cutting curd coarse in hard and soft condition upon amount of water retained in cheese.

NUMBER OF EXPERIMENT.	Condition of curd when cut.	Pounds of water in cheese made from 100 lbs. of milk.
58.....	Hard and coarse	4.45
59.....	Soft and coarse	4.47

When the curd was cut coarse, the hard and soft-cut curd retained practically the same amount of moisture. As compared with moisture retained when the curd was cut ordinarily fine and in soft and hard conditions, experiments 54 and 55, made from milk of the same composition, show that the coarse-cut curd retained 0.35 pounds more of moisture than the more finely-cut curd.

5. Influence of skimming milk upon amount of water retained in cheese.

NUMBER OF EXPERIMENT.	Kind of milk.	Pounds of fat in 100 lbs. of milk.	Pounds of water in cheese made from 100 lbs. of milk.
57.....	Skimmed	3.25	3.71
56.....	Whole-milk	3.95	4.00

The cheese made from 100 pounds of skimmed milk retained 0.29 pounds less moisture than that made from the whole-milk.

Amount of Fat Retained in Cheese made from 100 Pounds of Milk.

Statement of Results.

Grouping and averaging results, we have the following table:

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of fat in cheese made from 100 lbs. of milk.	Increase of fat in 100 lbs. of milk.	Increase of fat in cheese made from 100 lbs. of milk.
57	3.25	3.10	.....	.....
47	3.50	3.33	0.25	0.23
46	3.60	3.32	0.35	0.22
50	3.75	3.54	0.54	0.44
45	3.80	3.52	0.55	0.42
51	3.85	3.58	0.60	0.48
49	3.90	3.58	0.60	0.48
52, 53, 56	3.95	3.64	0.70	0.54
48, 54, 55, 58, 59	4.00	3.75	0.75	0.65
60, 61	4.10	3.92	0.85	0.82

An examination of the last two columns in the preceding table indicates that when the fat in the milk increased the amount of fat retained in the cheese increased also, and, as a rule, followed quite closely the increase of fat in the milk, even in spite of marked variations in conditions of manufacture.

Amount of Caseine and Albumen Retained in Cheese made from 100 Pounds of Milk.

Statement of Results.

Taking all the experiments of June, the caseine and albumen varied from 3.00 to 3.29 pounds in 100 pounds of milk, while the caseine and albumen retained in the cheese made from 100 pounds of milk varied from 2.38 to 2.60 pounds. This indicates pretty close uniformity in respect to the amount of caseine and albumen of the milk retained in the cheese even when the conditions of manufacture vary considerably.

Influence of Different Milk-Constituents in Increasing Yield of Cheese.

NUMBER OF EXPER- IMENT.	YIELD OF CHEESE FROM 100 POUNDS OF MILK.		POUNDS OF FAT IN CHEESE MADE FROM 100 POUNDS OF MILK.		POUNDS OF CASEINE AND ALBUMEN IN CHEESE MADE FROM 100 POUNDS OF MILK.		POUNDS OF WATER, ASH, ETC., IN CHEESE MADE FROM 100 POUNDS OF MILK.	
	Increase of yield.	Decrease of yield.	Increase of fat in cheese.	Decrease of fat in cheese.	Increase of caseine and albumen in cheese.	Decrease of caseine and albumen in cheese.	Increase of water, etc., in cheese.	Decrease of water, etc., in cheese.
57 .....	.....	.....	.....	.....	.....	.....	.....	.....
47	0.40	.....	0.23	.....	.....	0.19	0.36	.....
46 .....	.....	0.40	0.22	.....	.....	0.17	.....	0.45
50	0.30	.....	0.44	.....	.....	0.14	.....	.....
45 .....	.....	0.20	0.42	.....	.....	0.14	.....	0.48
51	0.38	.....	0.48	.....	.....	0.17	0.07	.....
49	0.30	.....	0.48	.....	.....	0.09	.....	0.09
52	0.80	.....	0.49	.....	.....	0.01	0.32	.....
53	0.90	.....	0.49	.....	0.03	.....	0.38	.....
56	0.90	.....	0.65	.....	.....	0.13	0.38	.....
48	0.80	.....	0.68	.....	.....	0.11	0.23	.....
54	0.90	.....	0.58	.....	.....	0.05	0.37	.....
55	0.90	.....	0.62	.....	.....	0.04	0.32	.....
58	1.45	.....	0.68	.....	.....	0.06	0.83	.....
59	1.45	.....	0.67	.....	.....	0.05	0.83	.....
60	1.50	.....	0.79	.....	.....	0.05	0.76	.....
61	1.60	.....	0.82	.....	.....	0.02	0.80	.....

The order of arrangement of experiments in the preceding table is based upon amount of fat in milk, commencing with the lowest. For further explanation, see report of Geo. A. Smith, in Eighth Annual Report of the New York State Dairy Commissioner, and "Cheese Investigation and Experiments for May," in this report.

Statement of Results.

1. Influence of fat on yield of cheese.

In every case a portion of the increased yield of cheese was due to fat varying from 0.20 to 0.82 pounds for 100 pounds of milk. On an average, about seventy-three per cent of the increase of yield was due to increase of fat in the cheese.

2. Influence of caseine and albumen on yield of cheese.

As happened in the July experiments, so in the August experiments, it chanced that the cheese, made from the milk used in experiment 56, which contains the least amount of fat and which is therefore used as a basis for comparing yields, contains more caseine and albumen than any other cheese except one. Hence, so far as the caseine and albumen had any effect on the yield it was to diminish rather than to increase. There was a decreased amount of caseine and albumen in the cheese, varying from 0.01 to 0.19 pounds and averaging about 0.09 pounds.

3. Influence of water, ash, etc., on yield of cheese.

a. In three cases there was a decrease of water, ash, etc., varying from 0.09 to 0.48 pounds, and averaging 0.34 pounds.

b. In the other cases there was an increase of water, ash, etc., in the cheese, varying from 0.07 to 0.83 pounds, and averaging about 0.44 pounds.

c. Averaging all the experiments, it appears that about thirty-nine per cent of the increase of yield was due to increase of water, ash, etc., in the cheese.

4. General summary.

Averaging all the experiments, we have the following:

	Pounds.	Per cent.
Average increased yield of cheese.....	0.75	....
Average increased yield of fat.....	0.55	73.3
Average decreased yield of caseine and albumen	0.09	12.0
Average increased yield of water, etc.....	0.29	38.7

Adjusting the gains and losses of yield, it appears that in the August experiments 65.4 per cent of the increased yield of cheese was due to increase of fat, 34.6 per cent to increase of water, ash, etc., while the caseine and albumen contributed nothing to increased yield.

Relation of Fat in Milk to Yield of Cheese.

TABLE SHOWING RELATION OF FAT IN MILK TO YIELD OF CHEESE.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of cheese made from 100 lbs. of milk.	Pounds of cheese made for each pound of fat in milk.
47.....	3.50	10.20	2.91
46.....	3.60	9.40	2.61
50.....	3.75	10.10	2.69
45.....	3.80	9.60	2.53
51.....	3.85	10.18	2.64
49.....	3.90	10.10	2.60
48.....	4.00	10.60	2.65
57*.....	3.25	9.80	3.02
52.....	3.95	10.60	2.68
53.....	3.95	10.70	2.71
56.....	3.95	10.70	2.71
54.....	4.00	10.70	2.68
55.....	4.00	10.70	2.68
58.....	4.00	11.25	2.81
59.....	4.00	11.25	2.81
60.....	4.10	11.30	2.76
61.....	4.10	11.40	2.78

Statement of Results.

1. Pounds of cheese made for each pound of fat in milk.

a. Factory experiments.—The amount of cheese made for each pound of fat in the normal milks varied from 2.60 pounds to 2.91 pounds. The average was 2.66 pounds.

b. Station experiments.—Omitting the experiment in which skim-milk was used, the amount of cheese made for each pound of fat in the milk varied from 2.68 to 2.81 pounds, and averaged 2.74 pounds.

Skimming the milk as in 57 increased the amount to about three pounds.

* Partially skimmed.

Loss of Cheese in Weight for First Month.

TABLE SHOWING LOSS OF STATION CHEESE IN WEIGHT.

NUMBER OF EXPERIMENT.	Weight of cheese when green.	Weight of cheese when one month old.	Pounds lost in four weeks.	Pounds of loss in weight in four weeks for 100 pounds of cheese.
57	23.25	21.75	1.50	6.45
52	26.50	25.00	1.50	5.66
53	26.75	25.00	1.75	6.54
56	26.75	25.00	1.75	6.54
54	26.75	24.25	2.50	9.34
55	26.75	24.75	2.00	7.48
58	27.25	25.50	1.75	6.43
59	27.25	25.50	1.75	6.43
60	26.05	24.75	1.25	4.81
61	26.25	24.75	1.50	5.71

Statement of Results.

The loss of weight during the first month varied from 1.25 to 2.50 pounds, and averaged about 1.75 pounds. Calculating for 100 pounds of cheese, the loss varied from 4.81 to 9.34 pounds, and averaged 6.55 pounds.

TABLE SHOWING COMPARISON OF STATION CHEESE.

NUMBER OF EXPERIMENT.	Kind of cheese.	Date of manufacture.	Special condition of manufacture.	Flavor.	Body.	Texture.	Color.	Appearance.	Total number of Marks.	Date of examination.
52	Stirred-curd.	Aug. 23	.....	40	25	15	15	5	100	Sept. 30
53	Cheddar....	Aug. 23	.....	40	25	15	15	5	100	Sept. 30
54	Cheddar....	Aug. 24	Curd cut hard	40	20	15	15	5	95	Sept. 30
55	Cheddar....	Aug. 24	Curd cut soft.....	40	20	15	15	5	95	Sept. 30
56	Cheddar....	Aug. 25	Whole milk (3.95 per cent fat)	35	20	15	15	5	95	Sept. 30
57	Cheddar....	Aug. 25	Milk partially skimmed (3.25 per cent fat)...	35	20	15	15	5	95	Sept. 30
58	Cheddar....	Aug. 26	Curd cut coarse and hard.....	35	20	15	15	5	90	Sept. 30
59	Cheddar....	Aug. 26	Curd cut coarse and soft	35	20	15	15	5	90	Sept. 30
60	Cheddar....	Aug. 27	Three ounces of rennet.	35	22	15	15	5	92	Sept. 30
61	Cheddar....	Aug. 27	Six ounces of rennet...	35	17	15	15	5	87	Sept. 30

Description of Commercial Qualities of Cheese.

No. 52. Flavor, perfect; body, solid, firm and smooth; texture, fine and close.

No. 53. Flavor, perfect; body, solid, firm and smooth; texture, fine and close.

No. 54. Flavor, perfect; body, smooth and solid, but somewhat salvy or lacking in firmness, owing to presence of excessive moisture; texture fine and close.

No. 55. Same as No. 54.

No. 56. Flavor, a little "off," strong; body, solid, firm and smooth; texture, fine and close.

No. 57. Flavor, good but very mild; body, solid, firm and smooth; texture, fine and close.

No. 58. Flavor, good but not perfect; body, smooth and solid, but salvy; texture, fine and close.

No. 59. Same as No. 58.

No. 60. Flavor, good but not perfect; body, smooth and solid but somewhat salvy; texture, fine and close.

No. 61. Flavor and texture, like No. 60; body, smooth and solid, but very soft and salvy.

1. The cheese made from curd cut coarse contained an excessive amount of moisture which caused the body of the cheese to be lacking in firmness.

2. The use of an extra amount of rennet in experiment 61 appears to have caused an increased lack of firmness or greater softness, which was very marked. The difference could not have been due to difference of moisture, since No. 61 and No. 62 contained very nearly the same amount of moisture.

3. The cheese made from partially skimmed milk was lacking in flavor.

• TABULATED SUMMARY OF RESULTS.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of fat lost in whey for 100 lbs. of milk.	Per cent of fat in milk lost in whey.	Pounds of caseine and albumen in 100 lbs. of milk.	Pounds of caseine and albumen lost in whey for 100 lbs. of milk.	Per cent of caseine and albumen in milk lost in whey.	Pounds of caseine in 100 lbs. of milk.	Pounds of albumen in 100 lbs. of milk.	Pounds of caseine for one lb. of albumen in milk.	Pounds of fat for one lb. of caseine and albumen in milk.
Normal milk, 47	8.50	0.32	7.08	8.00	0.72	24.00	2.45	0.55	4.5	1.17
Normal milk, 48	8.60	0.34	9.14	8.01	0.74	24.58	2.45	0.56	4.4	1.20
Normal milk, 50	8.75	0.26	9.44	8.05	0.75	24.59	2.47	0.58	4.8	1.23
Normal milk, 45	8.80	0.36	6.93	8.01	0.72	23.92	2.46	0.55	4.5	1.26
Normal milk, 51	8.85	0.29	9.47	8.08	0.78	24.10	2.47	0.56	4.4	1.27
Normal milk, 49	8.90	0.37	7.53	8.09	0.78	23.62	2.46	0.63	3.9	1.26
Normal milk, 52, 53, 56	8.96	0.30	9.49	8.28	0.80	24.33	2.50	0.77	3.2	1.21
Normal milk, 48, 54, 55, 58, 59	4.00	0.27	7.60	8.22	0.79	24.53	2.52	0.69	3.6	1.24
Normal milk, 60, 61	4.10	0.26	6.75	8.17	0.75	23.66	2.54	0.63	4.0	1.29
Partially skimmed, 57	8.25	0.23	6.10	8.27	0.81	24.77	2.60	0.67	3.9	0.99
Average of normal factory experiments	8.77	0.32	8.50	8.04	0.78	24.00	2.46	0.58	4.2	1.24
Average of normal station experiments	4.00	0.27	6.75	8.24	0.79	24.38	2.53	0.71	3.6	1.25
Average of all normal experiments	3.90	0.29	7.44	8.16	0.76	24.05	2.50	0.66	3.8	1.24
Average of all station experiments	3.94	0.27	6.85	8.24	0.79	24.88	2.53	0.71	3.6	1.21
Average of all August experiments	3.87	0.29	7.50	8.16	0.76	24.05	2.50	0.66	3.8	1.23

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of green cheese.												Pounds of loss in weight for 100 lbs. of cheese in four weeks.	
	Pounds of fat in 100 lbs. of green cheese.	Pounds of caseine and albumen in 100 lbs. of green cheese.	Pounds of water in 100 lbs. of green cheese.	Pounds of water in 100 lbs. of green cheese.	Pounds of fat in 100 lbs. of water-free cheese.	Pounds of fat in 100 lbs. of water-free cheese.	Pounds of caseine and albumen in 100 lbs. of water-free cheese.	Pounds of caseine and albumen in 100 lbs. of water-free cheese.	Pounds of fat in 100 lbs. of water-free cheese.	Pounds of fat in 100 lbs. of water-free cheese.	Pounds of fat in 100 lbs. of water-free cheese.	Pounds of fat in 100 lbs. of water-free cheese.	Pounds of caseine and albumen in 100 lbs. of water-free cheese.	Pounds of caseine and albumen in 100 lbs. of water-free cheese.
Normal milk, 47	32.67	23.37	38.51	38.51	53.1	36.0	1.40	10.20	3.83	3.33	2.36	2.91	9.80	.....
Normal milk, 46	35.36	25.51	33.96	33.96	53.5	36.8	1.38	9.40	3.19	3.32	2.40	2.61	10.64	.....
Normal milk, 50	35.02	24.12	36.17	36.17	54.9	37.6	1.45	10.10	3.05	3.54	2.43	2.69	9.50	.....
Normal milk, 45	36.64	25.29	33.50	33.50	55.1	38.0	1.45	9.60	3.23	3.52	2.48	2.53	10.42	.....
Normal milk, 51	35.16	23.67	35.76	35.76	54.7	36.8	1.48	10.18	3.64	3.58	2.40	2.64	9.33	.....
Normal milk, 49	35.47	24.56	36.17	36.17	55.6	38.5	1.44	10.10	3.65	3.58	2.48	2.60	9.90	.....
Normal milk, 52, 53, 56	34.17	23.74	35.68	35.68	54.2	37.7	1.44	10.67	3.94	3.64	2.53	2.70	9.37	.....
Normal milk, 48, 54, 55, 58, 59	34.38	23.03	38.45	38.45	55.9	37.4	1.49	10.90	4.20	3.75	2.51	2.75	9.18	6.26
Normal milk, 60, 61	34.40	22.33	39.21	39.21	56.5	36.7	1.54	11.35	4.45	3.92	2.54	2.77	8.81	7.48
Partially skimmed, 57	31.68	26.26	37.86	37.86	51.0	42.2	1.21	9.80	3.71	3.10	2.57	3.02	10.20	5.26
Average of normal factory experiments	35.14	24.24	35.74	35.74	54.7	37.7	1.45	10.03	3.19	3.52	2.43	2.66	9.97	6.45
Average of normal station experiments	34.23	23.09	37.92	37.92	55.5	37.5	1.48	10.96	4.21	3.74	2.53	2.74	9.12	.....
Average of all normal experiments	34.63	23.60	36.97	36.97	55.1	37.6	1.47	10.55	3.94	3.65	2.48	2.71	9.48	6.55
Average of all station experiments	33.98	23.41	37.92	37.92	55.0	37.9	1.45	10.84	4.10	3.68	2.53	2.77	9.23	.....
Average of all August experiments	34.45	23.75	37.02	37.02	54.9	37.8	1.45	10.50	3.92	3.61	2.49	2.72	9.62	6.54

SUMMARY OF RESULTS.

I. Loss of Milk-constituents in Cheese-making.

1. *Fat.*

a. The actual amount of fat lost in the whey for 100 pounds of milk was fairly uniform under the same conditions of manufacture and was practically independent of the amount of fat in the milk.

b. The average amount of fat lost in the whey, in all the experiments, was 0.29 pounds (a little over 4 1-2 ounces) for 100 pounds of milk, which was about 7.50 per cent of the fat in the milk. In the factory experiments, the average loss was about 8.50 per cent of the fat in the milk; in the station experiments, it was about 6.75 per cent of the fat in the milk.

2. *Caseine and albumen.*

a. The amount of caseine and albumen lost in the whey was quite uniform under all the conditions tried.

b. The average amount of caseine and albumen lost in the whey, in all the August experiments, was about 0.76 pounds (about twelve ounces) for 100 pounds of milk, which was about twenty-four per cent of the caseine and albumen in the milk. The loss was practically the same in both the factory and the station experiments.

c. Taking all the milks, the caseine averaged 2.50 pounds and the albumen 0.66 pounds in 100 pounds of milk; for every pound of albumen, there were 3.8 pounds of caseine.

II. Influence of Composition of Milk on Composition of Cheese.

1. *Fat.*

a. In the cheese made from normal milk, the amount of fat in 100 pounds of green cheese varied from about 32.5 to 36.5 pounds, and averaged about 34.5 pounds. In the cheese made from milk one-fourth skimmed, the fat was diminished to 31.68 pounds.

In general, the fat exercised a greater influence upon the composition of the cheese than did any other constituent of the milk.

2. *Caseine and albumen.*

a. In the cheese made from the normal milks, the amount of caseine and albumen in 100 pounds of cheese was fairly uniform in quantity, varying in the green cheese from 22.3 to 25.5 pounds; and, in the water-free cheese, varying from 36.7 to 38.8 pounds. The milks containing least fat made cheese containing a little more caseine and albumen. Skimming the milk increased the per cent of caseine and albumen in the cheese.

3. *Relation of fat to caseine and albumen in cheese as a basis for determining the character of milk.*

a. The results appear to indicate that in cheese made from normal milk containing from 3.5 to 4 pounds of fat in 100 pounds of milk, there should be about 1.4 to 1.5 pounds of fat for one pound of caseine and albumen in the water-free cheese. Partial skimming reduced this ratio to 1.21 pounds.

III. Influence of Composition of Milk on Yield of Cheese.

1. *Fat.*

a. Of the increased yield of cheese obtained in the various experiments, nearly two-thirds of the increase, on an average, was due to an increase of fat in the milk from which the cheese was made.

b. The amount of fat retained in the cheese made from 100 pounds of milk increased when the amount of fat in the milk increased, but not with exact uniformity.

2. *Caseine and albumen.*

a. There was no increase of caseine and albumen in the milk, and hence no increased yield of cheese due to caseine and albumen.

3. *Water.*

a. About one-third of the increased yield of cheese was due to an increased amount of water retained in the cheese.

b. The amount of water retained in the cheese made from 100 pounds of milk was quite variable and appeared to be dependent upon conditions of manufacture more than upon composition of milk.

IV. Yield of Cheese.

1. *Pounds of cheese made from milk.*

a. Of the factory milk, there were required, on an average, 9.97 pounds to make one pound of cheese.

b. Of the station milk, 9.23 pounds sufficed to make one pound of cheese.

c. One hundred pounds of factory milk made, on an average, 10.03 pounds of green cheese; 100 pounds of station milk made 10.84 pounds of green cheese.

V. Influence of Variation of Conditions of Manufacture.

1. *Variation in amount of rennet used.*

a. Loss of milk-constituents.—The use of a large amount of rennet was accompanied by a smaller loss of fat.

b. Yield.—The yield was slightly greater when the larger amount of rennet was used.

c. Quality.—At the end of one month, the cheese which contained the larger amount of rennet showed, from a commercial standpoint, a more advanced degree of ripeness.

2. *Cutting curd in hard and soft condition.*

a. Loss of milk-constituents.—In one case, hard cutting gave greater loss of fat, while in the other, the soft cutting gave larger loss. The difference was small in either case.

b. Yield.—The yield was practically the same in the hard as in the soft cutting.

3. *Comparison of stirred-curd and Cheddar processes.*

a. Loss of milk-constituents.—In one comparison, the loss was practically the same; in another, the loss was considerably greater in the stirred-curd process.

b. Yield.—There was no essential difference in yield by the two processes.

c. Quality.—A commercial examination showed no difference in quality at the end of one month.

4. *Cutting curd coarse.*

a. Loss of milk-constituents.—There was a smaller loss when the curd was cut coarse.

b. Yield.—The yield was decidedly greater when the curd was cut coarse, owing to retention of an increased amount of water.

c. Quality.—The cheese was very salvy, owing to excess of moisture retained, when the curd was cut coarse.

VI. Loss of Cheese in Weight During First Month.

a. The loss of weight varied, for the first month, from 4.81 to 9.34 pounds, and averaged 6.55 pounds for each 100 pounds of green cheese.

At the request of Professor H. H. Wing, of the Cornell University Experiment Station, I went to Ithaca, in June, to assist him in experimental work as to determining the relative value of milk from Holstein and Jersey cows for cheese-making purposes, as it is claimed by many that, while the milk from the Holstein does not contain as much fat as that of the Jersey, the amount of caseine and albumen in the same more than balances the loss of fat. While these experiments do not definitely prove any thing of great importance, they do show that the milk containing the larger per cent of fat produced considerably the most cheese, and that of a far better quality. In September, when these cheese were examined, the flavor and texture of those from the richer milk was found a great deal the best.

Following will be found the analyses of the milk and cheese at these experiments.

HOLSTEIN MILK.

June 28.

Weight of milk, 98.5 pounds; amount of rennet, 8 c. c.; milk set, 11.10 a. m.; milk thick, 11.19 a. m.; curd dipped, 4.15 p. m.; curd salted, 4.35 p. m. (salt 3 ounces); cheese pressed, 5.55 p. m.; weight of whey, 84.25 pounds.

June 29. Weight of cheese from press, 9 pounds.

August 2. Weight of cheese, 8 pounds 3.5 ounces.

September 2. Weight of cheese, 7 pounds 15 ounces.

Analysis of Milk.

Total solids, 12.35 per cent; total fat, 2.97 per cent; total caseine and albumen, 3.50 per cent; total ash, .73 per cent.

Analysis of Whey.

Total solids, 7.10 per cent; total fat, .30 per cent; total caseine and albumen, 1.06 per cent; total ash, .62 per cent.

Analysis of Green Cheese.

Total solids, 60.57 per cent; total water, 39.43 per cent; total ash, 2.49 per cent; total fat, 19.59 per cent; total caseine by difference, 38.49 per cent.

JERSEY MILK.

June 28.

Weight of milk, 132 pounds; amount of rennet, 10 c. c.; milk set, 12.45 p. m.; milk thick, 12.57 p. m.; curd dipped, 5.35 p. m.; curd salted, 5.50 p. m.; cheese pressed, 7.15 p. m.; weight of whey, 108.25 pounds.

June 29. Weight of cheese from press, 16 pounds 8 ounces.

August 2. Weight of cheese, 15 pounds 4.5 ounces.

September 2. Weight of cheese, 14 pounds 14 ounces.

Analysis of Milk.

Total solids, 14.26 per cent; total fat, 4.93 per cent; total caseine and albumen, 3.75 per cent; total ash, .70 per cent.

Analysis of Whey.

Total solids, 7.17 per cent; total fat, .43 per cent; total caseine and albumen, not given; total ash, .65 per cent.

Analysis of Green Cheese.

Total solids, 64.36 per cent; total water, 35.64 per cent; total ash, 2.16 per cent; total fat, 38.58 per cent; total caseine by difference, 23.62 per cent.

HOLSTEIN MILK.

June 29.

Weight of milk, 111 pounds; amount of rennet, 8.5 c. c.; milk set, 9.24 a. m.; milk thick, 9.35 a. m.; curd dipped, 1.20 p. m.; curd salted, 1.32 p. m. (salt, 3.5 ounces); cheese pressed, 3.55 p. m.; weight of whey, 91 pounds.

July 1. Weight of cheese from press, 9 pounds 12 ounces.

August 2. Weight of cheese, 8 pounds 11 ounces.

September 2. Weight of cheese, 8 pounds 7 ounces.

Analysis of Milk.

Total solids, 12.14 per cent; total fat, 2.95 per cent; total caseine and albumen, 3.38 per cent; total ash, .72 per cent.

Analysis of Whey.

Total solids, 7.06 per cent; total fat, .25 per cent; total caseine and albumen, not given; total ash, not given.

Analysis of Green Cheese.

Total solids, 60.86 per cent; total water, 39.14 per cent; total fat, 23.67 per cent; total ash, 2.74 per cent; total caseine by difference, 34.45 per cent.

JERSEY MILK.

June 29.

Weight of milk, 143.5 pounds; amount of rennet, 10.5 c. c.; milk set, 9.27 a. m.; milk thick, 9.39 a. m.; curd dipped, 1 p. m.; curd salted, 1.30 p. m. (salt, 7 ounces); cheese pressed, 3.50 p. m.; weight of whey, 120 pounds.

July 1. Weight of cheese from press, 18 pounds.

August 2. Weight of cheese, 16 pounds 8 ounces.

September 2. Weight of cheese, 16 pounds 2 ounces.

Analysis of Milk.

Total solids, 14.47 per cent; total fat, 5.08 per cent; total caseine and albumen, 3.56 per cent; total ash, .74 per cent; total sugar by difference, 5.09 per cent.

Analysis of Whey.

Total solids, 7.45 per cent; total fat, .35 per cent; total caseine and albumen, not given.

Analysis of Green Cheese.

Total solids, 66.71 per cent; total water, 33.29 per cent; total fat, 39.21 per cent; total ash, 2.98 per cent; total caseine by difference, 24.52 per cent.

SPEED CHEESE.

(POORER MILK.)

June 30.

Weight of milk, 2,033 pounds; amount of rennet, 4 ounces; milk set, 10.38 a. m.; milk thick, 10.58 a. m.; curd cut, 11.05 a. m.; curd dipped, 1.47 p. m.; curd salted, 2 p. m.

July 1. Weight of cheese from press, 194 pounds.

July 6. Weight of cheese, 25 pounds 12.5 ounces.

August 2. Weight of cheese, 24 pounds 5.5 ounces.

September 2. Weight of cheese, 23 pounds 13 ounces.

Analysis of Milk.

Total solids, 12.29 per cent; total fat, 3.48 per cent.

Analysis of Whey.

Total solids, 7.18 per cent; total fat, .36 per cent.

Analysis of Green Cheese.

Total solids, 62.83 per cent; total water, 37.14 per cent; total fat, 33.71 per cent; total ash, 3.16 per cent; total caseine by difference, 25.99 per cent.

SPEED CHEESE.

(RICHER MILK.)

June 30.

Weight of milk, 1,657 pounds; amount of rennet, 2 2-3 ounces; milk set, 10.10 a. m.; milk thick, 10.35 a. m.; curd cut, 10.48 a. m.; curd dipped, 2.12 p. m.; curd salted, 2.33 p. m.

July 1. Weight of cheese from press, 163 pounds.

July 6. Weight of cheese, 24 pounds 4.5 ounces.

August 2. Weight of cheese, 22 pounds 14.5 ounces.

September 2. Weight of cheese, 22 pounds 5 ounces.

Analysis of Milk.

Total solids, 12.71 per cent; total fat, 3.64 per cent.

Analysis of Whey.

Total solids, 7.38 per cent; total fat, .37 per cent.

Analysis of Cheese.

Total solids, 63.31 per cent; total water, 36.69 per cent; total fat, 34.81 per cent; total ash, 2.33 per cent; total caseine by difference, 26.17 per cent.

During the past year considerable progress has been made in the work of dairy instruction, for while it has taught us that there are a great many things in regard to milk that we know very little about, it has made some disputed points quite clear.

The one question of the influence of the fat on the yield of cheese has been so well answered that there can be no farther dispute about it, that the fairest way to pay for milk at the cheese factory is upon the basis of the fat that it contains.

When this plan is inaugurated it will do away with a large part of the cheesemaker's trouble. When the farmer works on the line of a better quality of milk, as he certainly will when he is paid for it according to the number of pounds of fat that it contains, he will naturally give more attention to the way that it is cared for.

There has been so much agitation of the subject of the best way to handle milk for cheese-making that the majority of the makers have studied the question quite thoroughly for the last two or three years and have improved themselves wonderfully. There is no question but that the general standard of our cheese has been improved, that is, there is less poor cheese made than formerly.

Now, if by any means we can elevate the standard of the milk as it is delivered to the factory there is no question but that

we will have a still better class of goods. Then there is another benefit to be derived from paying for the milk on the basis of the fat. There has been work enough done in analyzing the milk and cheese to establish a reasonably correct standard for the amount of cheese that should be made from a certain per cent of fat in the milk, when it is in good condition. This will give the farmer a point to work from with the cheese-maker. When he knows the standard per cent of fat in the milk delivered at the factory, he is in a position to say, to the maker, if you do not produce the amount of cheese of a standard quality that I am entitled to from milk containing that amount of fat then you must not expect my patronage. This will put the maker in a position that he must fit himself to do good work or he cannot obtain employment as a cheesemaker. It will drive out the man that has not brains enough to comprehend the requirements of such a position. It is through the aid of such means that I look for the marked improvement in the average quality of our cheese.

The line of work that we have been pursuing under your direction has had this object in view at all times, and I think I may say that the prospects are better than at any time since the beginning of our efforts for the establishment of a higher standard for American cheese.

Respectfully submitted.

G. A. SMITH,
Cheese Instructor.

Report of W. W. Hall.

Hon. J. K. BROWN, *State Dairy Commissioner, Albany, N. Y.*

Dear Sir.—I have the honor to submit the following as a report of the work performed by me as cheese instructor during the year ended September 30, 1892. Being out of St. Lawrence county quite a portion of the cheese-making season, I spent most of the month of October among the cheese factories of this county. During the month of November I was engaged a portion of the time operating the Babcock test at creameries and dairies. I made a complete test at the Woodville creamery in Jefferson county of each patron's milk, and left a full report of same. This was done November 10, 1891. On November nineteenth I attended an institute at Malone, N. Y. At this meeting I operated and explained the working of the Babcock test. November twenty-fourth I attended and participated, in company with Mr. Ives, in the work at an institute at Woodville, N. Y. I addressed the meeting upon the improvements which had been made in cheese-making during the year. The second week in December I attended the annual convention of the State Dairy-men's Association, held at Owego, N. Y.; from there I went to assist in State farmers' institutes held at Orchard Park, Erie county, and at Gowanda, Cattaraugus county. On December twenty-third I made a complete test of all the milk at the Belleville creamery, in Jefferson county. On January 8, 1892, at your request, I attended a meeting in Boonville, Oneida county, where I made a practical test of samples of milk brought in by dairy-men, and addressed them upon the subjects of caring for their milk and cheese-making. January twenty-seventh, in company with M. T. Morgan, I held a dairy meeting at Constableville, Lewis county, N. Y., and gave instructions in cheese-making and the use of the Babcock test. February 3, 1892, I attended a dairy

meeting at Canton, St. Lawrence county, in company with Seth Fenner, and gave instructions in dairying. February twenty-seventh, at your request, I visited Trenton, N. Y., and addressed the grangers upon the subject of milk aeration and gave an exhibit of the Babcock test. In March I assisted M. T. Morgan at a dairy meeting in Brookfield, Madison county, and Messrs. Smith and Van Alstyne at Edwards, St. Lawrence county. During these winter months I also visited a number of dairy farms and tested the milk of individual cows in addition to attending these meetings.

There is nothing that interests the dairy farmer any more than the practical working of the Babcock test. The fat being thrown up in the graduating tube, where it can be seen, is very much more satisfactory than to place the percentage of fat in milk on paper and try to explain it. The subject of paying for milk according to its fat value was discussed thoroughly in one factory in Jefferson county where I exhibited the machine, and when the factory season opened they purchased one and carefully credited each patron with his first amount of fat each day. When the first sale of cheese was made and the dividends were figured upon the basis of the value of a pound of fat instead of a pound of milk it was found that the patrons instead of receiving each an equal amount for a hundred pounds of milk, they received some as low as sixty-nine cents and others as high as \$1.02 per 100 pounds. The proprietor could hardly believe that this was right and wrote me the results to get my opinion as to the accuracy of the test. After giving him all the information I could in regard to it, I never heard whether they continued to pay on the new plan or not. I find by this test much more variation in the per cent of fat in early spring when the cows are being kept up and fed on dry fodder than I do after they are out on a full grass ration. At the Potsdam creamery, D. Frank Ellis, prop., I was requested to make frequent tests of his entire patronage during the season, and only for a lack of time I should have been glad to have complied; however, on April sixteenth, I made a very careful test of all his milk and found the different dairies to vary from 2.5 per cent to 4.3 per cent of

fat; on May seventeenth I again made a careful test of the dairies, something over ninety in all, and found the dairy that tested 2.5 per cent April sixteenth showed 3.87, and the one which tested 4.3 per cent April sixteenth tested 4.2 per cent in May. This shows that cows can be fed so as to keep them in good flesh and they will give milk that will contain a large percentage of fat, while kept on dry fodder, or they can be so poorly cared for that they will become poor in flesh, give a small quantity of milk and that of very poor quality. The herd that gave the 4.3 per cent of fat on April sixteenth was in very fine condition and gave a large quantity of milk as well as a good quality. The cows of the other dairy were thin in flesh and were being fed on poor hay and very little grain.

In making these tests I carefully kept an account of the per cent of fat found, the amount of milk delivered by each patron, the total amount of fat his milk contained, and the amount of butter his milk should make with the twelve per cent allowance for moisture, etc., added.

Potsdam Creamery Milk Test, April 16, 1892.

Number of test.	Per cent of fat	Pounds of butter to 100 pounds of milk.	Pounds of milk of patron's milk should make.	Pounds of butter each
1	4.2	4.68	57	2.667
2	3.6	3.98	224	8.915
3	3.2	3.50	99	3.465
4	3.0	3.27	297	9.711
5	3.6	3.98	189	7.522
6	2.6	2.80	132	3.696
7	4.0	4.44	248	11.011
8	4.3	4.80	445	21.360
9	3.5	3.86	484	18.682
10	3.1	3.39	128	4.339
11	3.4	3.74	310	11.594
12	4.3	4.80	156	7.488
13	3.7	4.10	537	22.017
14	3.6	3.98	167	6.646
15	3.8	4.21	205	8.630
16	3.8	4.21	348	14.650

Number of test.	Per cent of fat.	Pounds of butter to 100 pounds of milk	Pounds of milk.	Pounds of butter each patron's milk should make.
17	3.6	3.98	525	20.895
18	3.8	4.21	649	27.322
19	3.7	4.10	146	5.986
20	3.4	3.74	205	7.667
21	2.7	2.92	452	13.198
22	3.4	3.74	224	8.377
23	3.2	3.50	445	15.575
24	3.5	3.86	273	10.537
25	3.6	3.98	236	9.392
26	3.2	3.50	427	14.945
27	3.0	3.27	347	11.346
28	3.4	3.74	264	9.873
29	3.4	3.74	420	15.708
30	3.6	3.98	199	7.920
31	3.2	3.50	375	13.125
32	3.6	3.98	201	7.999
33	4.0	4.44	165	7.326
34	3.5	3.86	134	5.172
35	3.4	3.74	302	11.294
36	4.2	5.68	283	13.244
37	3.4	3.74	390	14.586
38	4.1	4.56	138	6.292
39	3.4	3.74	595	22.253
40	3.6	3.98	570	22.686
41	4.0	4.44	207	9.19
42	3.7	4.10	335	13.735
43	3.1	3.39	533	18.068
44	3.5	3.86	514	19.840
45	3.0	3.27	124	4.054
46	3.7	4.10	168	6.888
47	2.6	2.80	375	10.500
48	3.3	3.62	124	4.488
49	3.5	3.86	116	4.477
50	2.5	2.68	332	8.897
51	3.2	3.50	183	6.405

Number of test.	Per cent of fat.	Pounds of butter to 100 pounds of milk.	Pounds of milk.	Pounds of butter each patron's milk should make.
52	3.3	3.62	158	5.719
53	4.2	4.68	482	22.557
54	3.7	4.10	258	10.578
55	3.4	3.74	281	10.509
56	3.1	3.39	136	4.610
57	3.2	3.50	279	9.765
			16,596	635.391
Churn, 661 pounds.				

Fall Island Milk Test, April 23, 1892, Potsdam, N. Y.

Number of test.	Per cent of fat.	Pounds of butter to 100 pounds of milk.	Pounds of milk.	Pounds of butter each patron's milk should make.
1	3.9	4.32	117	5.05
2	3.4	3.74	419	15.67
3	2.7	2.92	174	5.08
4	5.4	6.14	503	30.88
5	3.3	3.62	248	8.98
6	3.6	3.98	205	8.16
7	3.2	3.50	279	9.77
8	4.0	4.44	148	6.57
9	3.6	3.98	262	10.43
10	4.0	4.44	57	2.53
11	3.6	3.98	480	19.10
12	3.7	4.10	522	21.40
13 .....	....	3.74	302	11.29
14	3.6	3.98	182	7.24
15	3.2	3.50	161	5.64
16	4.4	4.93	184	9.07
17	3.8	4.21	540	22.73
18	2.6	2.80	150	4.20
19	3.2	3.50	203	7.10
20	3.4	3.74	412	15.41
21	3.3	3.62	144	5.21
22	3.6	3.98	82	3.26
23	2.8	3.03	498	15.09

Number of test.	Per cent of fat	Pounds of butter to 100 pounds of milk.	Pounds of milk.	Pounds of butter each patron's milk should make.
24	3.4	3.74	177	6.62
25	3.8	4.21	108	4.55
26	3.8	4.21	152	6.40
27	3.7	4.10	175	7.18
28	3.4	3.74	448	16.76
29	2.8	3.03	70	2.12
30	4.3	4.80	296	14.21
31	3.9	4.32	437	18.88
32	3.6	3.98	273	10.86
33	3.6	3.98	151	6.01
34	4.0	4.44	262	11.63
35	3.8	4.21	362	15.24
36	3.7	4.10	202	8.28
37	4.0	4.44	153	6.79
38	3.5	3.86	580	22.39
39	3.0	3.27	425	13.90
40	3.5	3.86	261	10.07
41	4.3	4.80	340	16.32
42	4.0	4.44	240	10.65
43	3.5	3.86	300	11.58
44	3.6	3.98	212	8.44
45	3.6	3.98	388	15.44
46	3.8	4.21	365	15.37
47	3.8	4.21	145	6.10
48	3.8	4.21	90	3.79
49	3.7	4.10	238	9.76
50	3.0	3.27	305	9.97
51	3.9	4.32	92	3.97
52	4.0	4.44	183	8.12
53	3.8	4.21	81	3.41
54	3.0	3.27	116	3.79
55	3.4	3.74	170	6.36
56	3.6	3.98	538	21.41

Number of test.	Per cent of fat.	Pounds of butter to 100 pounds of milk.	Pounds of milk.	Pounds of butter each patron's milk should make.
57	3.2	3.50	485	16.98
58	3.6	3.98	420	16.72
59	3.5	3.86	480	18.53
			<hr/>	<hr/>
			15,970	638.46
			<hr/>	<hr/>

Churn, 649 pounds.

Acid test, 638.46.

Potsdam, N. Y., Butter Test, May 17. 1892.

Number of test.	Per cent of fat.	Pounds of butter to 100 pounds of milk.	Pounds of milk.	Pounds of butter each patron's milk should make.
1	3.3	3.62	158	5.72
2	3.3	3.62	118	4.27
3	3.4	3.74	230	8.60
4	3.6	3.98	202	8.04
5	3.6	3.98	69	2.75
6	4.4	4.93	158	7.79
7	3.5	3.86	332	12.81
8	4.2	4.68	656	30.70
9	3.9	4.32	364	15.72
10	3.6	3.98	240	9.55
11	3.6	3.98	575	22.89
12	3.3	3.62	240	8.69
13	3.5	3.86	52	2.01
14	3.5	3.86	41	1.58
15	4.0	....	....	.....
16	4.2	4.68	333	15.58
17	4.1	4.56	102	4.65
18	3.8	4.21	147	6.19
19	3.2	3.50	59	2.07
20	3.8	4.21	217	9.13
21	4.4	4.93	210	10.35
22	4.3	4.80	90	4.32
23	3.8	4.21	155	6.52
24	3.9	4.32	431	18.62
25	4.0	4.44	286	12.70
26*	5.0	....	....	.....

* Cold setting; all others separator skim-milk.

Number of test.	Per cent. of fat.	Pounds of butter to 100 pounds of milk.	Pounds of milk.	Pounds of butter each patron's milk should make.
27	3.3	3.62	186	6.73
28	3.6	3.98	680	27.06
29	4.0	4.44	52	2.31
30	3.5	3.86	406	15.67
31	3.7	4.10	187	7.67
32	3.6	3.98	255	10.15
•33	4.1	4.56	286	13.04
34	4.2	4.68	630	29.48
35	3.9	4.32	757	32.70
36	3.5	3.86	175	6.76
37	3.6	3.98	271	10.79
38	3.4	3.74	226	8.45
39	3.6	3.98	371	14.77
40	4.1	4.56	117	5.33
41	3.6	3.98	525	20.90
42	3.8	4.21	198	8.34
43	4.0	4.44	263	11.68
44	3.5	3.86	300	11.58
45	4.4	4.93	323	15.92
46	4.9	5.53	359	19.85
47	4.6	5.17	391	20.21
48	4.2	4.68	306	14.32
49	3.6	3.98	414	16.48
50	3.7	4.10	192	7.87
51	3.3	3.62	229	8.29
52	3.7	4.10	722	29.60
53	3.7	4.10	219	8.98
54	4.6	5.17	448	23.16
55	3.3	3.62	75	2.71
56	4.6	5.17	669	34.59
57	4.0	4.44	459	20.38
58	3.8	4.21	257	10.82
59	4.2	4.68	424	19.84
60	3.8	4.21	522	21.98
61	3.6	3.98	71	2.82
62	3.7	4.10	36	1.48

Number of test.	Per cent of fat.	Pounds of butter to 100 pounds of milk.	Pounds of butter each patron's milk of milk. should make
63	3.8	4.21	223 9.39
64	3.8	4.21	192 8.08
65	3.8	4.21	349 14.69
66	3.7	4.10	171 7.01
67	4.5	5.05	512 25.86
68	4.1	4.56	725 33.06
69	3.9	4.32	593 25.62
70	3.8	4.21	91 3.83
71	4.4	4.93	560 27.61
72	3.7	4.10	196 8.04
73	3.8	4.21	243 10.23
74	4.2	4.68	108 5.05
75	4.2	4.68	87 4.07
76	3.5	3.86	325 12.55
77	4.3	4.80	245 11.76
78	3.9	4.32	69 2.98
79	3.9	4.32	149 6.44
80	4.6	5.17	167 8.63
81	3.9	4.32	194 8.38
82	3.8	4.21	220 9.26
83	3.9	4.32	132 5.70
84	4.4	4.93	333 16.42
85	4.1	4.56	83 3.78
86	0.3		
87	0.3		
88	Trace		
89	0.1		
90	0.3		
	.....	.....	23,433 1,022.40

Test, 1022.40 pounds.

Churn, 988 pounds.

I did not succeed in getting as much churned butter as my figures called for, for the reason that quite a portion of the cream was separated in branch factories, while the balance was raised

by dip-setting, which cut me short from what I should have had, had all the cream been separated by centrifugal force.

While I am reporting the fat tests I will give the results of one made by me in the Union creamery, St. Lawrence county, July sixth. I give this in full and show how completely we can ascertain the amount of butter the milk will churn making a careful fat test. The rule is to multiply the amount of milk each patron delivers by his per cent of fat to find the total amount of fat he delivered and, after going through all the milk in like manner, add up the total fat column and add twelve per cent to it all, for moisture, etc., in churned butter. Following is the test:

Sample.	Pounds of milk.	Per cent of fat.	Total pounds pure fat.
1	323	3.4	10.982
2	131	3.5	4.585
3	87	3.8	3.308
4	549	3.8	20.862
5 .....	.....	.3	.....
6.	267	3.6	9.612
7	388	3.7	14.356
8	273	3.8	10.374
9	345	3.8	13.110
10	269	3.6	9.684
11	554	3.8	21.052
12	294	3.8	11.172
13	154	3.6	5.544
14	591	3.5	20.685
15	248	4.1	10.168
16	192	3.9	7.488
17 .....	.....	.3	.....
18	87	3.8	3.306
19	268	4.0	10.720
20	438	3.4	14.892
21	164	3.8	6.232
22	145	3.7	5.365
23 .....	.....	.2	.....
24 .....	.....	.2	.....
25	610	3.9	23.790
26	401	3.6	14.436
27	550	3.4	18.904

Sample	Pounds of milk.	Per cent of fat.	Total pounds pure fat.
28	507	4.0	20.280
29	166	3.0	4.980
30	363	3.8	13.794
31 .....		.3	.....
32 .....		.3	.....
		Average.	
Totals, July sixth.....	8,370	3.7	309.681
Twelve per cent added for moisture.....			37.161
Estimated amount of churned butter, pounds....			346.842
Amount butter actually churned, July seventh, pounds.			347

I tested the milk after going through the separator and found that the amount remaining in the skimmed milk varied with the rapidity with which it was run through, for example: when 1,000 pounds were run through per hour the skimmed milk contained 0.2 per cent fat; when 1,300 pounds were run through per hour the skimmed milk contained 0.3 per cent. By increasing the number of revolutions of the machine and running 1,500 pounds per hour the skimmed milk contained 0.2 per cent; keeping up the increased number of revolutions and running 2,000 pounds per hour the skimmed milk again contained 0.3 per cent. This convinced me that it would be profitable to experiment until that speed and quantity were found, which would leave the least fat, as it is evident from the above that the speed at which the machine is run and quantity of milk passing through in a given time influences very much the removal of the fat. This not only shows the accuracy of the Babcock test, but it shows that this was a well-managed creamery and, as the extremes only varied from 3 per cent to 4.1 per cent, it seems that in this community the dairymen had an eye to uniformity in breeding, if not to a high percentage of fat. The town of Lisbon is very level and quite low; at the time I made this test the water stood over quite a portion of the meadow lands as well as the pastures.

In the early part of May, in company with Dr. L. L. Van Slyke, G. A. Smith, M. T. Morgan, and H. A. Rees, I began the factory

experiments which, up to September first, will be found in G. A. Smith's report.

At this time I began active work in instructing cheese-makers throughout Jefferson and St. Lawrence counties, and continued to do so only as I was interrupted by attending to the experimental work at cheese factories, and at the experimental station at Geneva, until July eleventh. My experience has taught me, more particularly the last season, that it is not a question of the amount of fat the milk contains, but one of the amount retained in the cheese.

After my tests had been completed in the towns of Lisbon and Potsdam, as well as many other towns in the different counties in the State, I received a letter from a cheesemaker, asking me to come to his factory as soon as possible and bring my milk-testing apparatus. He said his cheese were being rejected in Montreal on account of being skimmed. He knew that some of his patrons were skimming their milk. I arrived at his factory about noon, and he was away delivering his cheese. I sat down and watched the methods of his helpers closely and I concluded, then, that the patrons might not be all to blame. The next morning I made a careful test both by specific gravity and Babcock methods. Although the pastures were high, dry, sandstone soil, what little there was, on an island in the St. Lawrence river, I found this milk gave the highest average of fat of any I had tested during the season. I took full control of the vat of milk and made the cheese. It was a very warm day in July, and he was in the habit of keeping all the doors shut, covering up the vat with a close covering, soon after he had shut off the steam from a hard, coarse-cut curd. After he had drawn the whey he kept a constant jet of steam under the covering until the curd showed a development of acid, by the iron test, sufficient to grind. When the curd was ready to grind it was full of moisture which had not been expelled, and it passed through the mill; the white whey flowed freely from it, taking the fat along with it. At the press the loss of fat was also heavy. I reversed his methods to a large extent, and, while the milk was quite badly tainted, I succeeded in getting a close firm curd, dry

and fat; when it passed through the mill not one drop of whey ran out of it. I not only made a close, meaty, full-cream cheese, but I made much more of it. It is a mistaken idea that the loss of fat in cheese is all caused by the patrons. It seems to me that the law should fix a fat basis for cheese as well as for milk. There is another loss at the cheese factories of the State which could be saved by a very slight expense and a little trouble on the part of the maker. If the dairymen were as anxious to take their share of whey in the flush of feed as they are to get their share when it becomes scarce it would assist the maker to a great extent in keeping the whey sweet, thereby increasing its value. Whey, as it is taken from the average factory during the warm weather, is almost worthless. If we value the whey at all, and care for it for feeding purposes, we must give it a little attention. It has a feeding value of about seven cents per hundred when it is sweet, and as it should be when fed to swine and calves. The following is the chemical analysis of a sample of whey from a vat of milk where the greatest care and economy had been practiced by the cheese-maker:

Water, 93.18; per cent total solids, 6.82; per cent fat, 0.29; per cent caseine and albumen, 0.88; per cent caseine, 0.12; per cent of albumen, 0.76; per cent of sugar, ash, etc., 5.65.

It is plain that all, or very nearly all, of the albumen in milk is lost in the whey; caseine is also lost in the whey, so that the principal constituent left in the whey for feeding purposes is the sugar. Unless some way is provided to prevent the lactic acid ferment from developing and destroying this nutritive element of the whey this loss will continue. My theory is, first, pass a resolution at the factory meeting that each patron shall draw all the whey he brings to the factory every day, unless the factory is so situated that the maker can allow the surplus to run off in a creek and not disturb the people who live along its banks. Rinse the vats out with cold water every morning and scald them thoroughly, at least twice a week. Conduct a one-half-inch steam-pipe from the dome of the factory boiler to the whey vat; place a globe valve in the pipe at the factory, where it can be controlled easily by the maker; after the whey has all been

run into the vats each day turn the steam on until the whey has been heated to at least 150 degrees Fahrenheit. The expense is very slight and the results will be satisfactory.

One hundred and fifty degrees is sufficient to kill the germ that produces the fermentation which is so damaging to the feeding value of the whey. Manufacturers in other products make a strong point in saving all the waste material, such as manufacturing lath from the slabs of the logs and using the refuse and saw dust for fuel to produce steam, claiming that by so doing they make a profit whereby they would otherwise many times suffer a loss. The amount of whey produced in the great State of New York if fed sweet, and if it has a feeding value of seven cents per hundred, which I have no doubt about, would amount to a very large sum of money, and this can be, and to a great extent is, lost by the negligence of cheese factory patrons and their makers.

July eleventh, in company with M. T. Morgan, I went to Chautauqua county to impart such knowledge to cheese-makers and dairymen as we were able to do, both by illustrating our methods of cheese-making by actual process as well as by the use of the Babcock test. The weather was warm during our stay in that county, and the milk was not in the best condition. We found by instructing the makers fully in regard to the process of ripening the milk, the proper degree being ascertained by the rennet test, assists them more than any one thing we have ever been able to accomplish. It overcomes many difficulties that have been such an annoyance to makers for many years. It is stated by an ex-cheese expert that if dairymen will aerate and cool their milk down to sixty-eight in summer months, allowing that other things are as they should be, that the milk will arrive at the factory in a proper stage of ripeness for best results without the use of a "starter." This is getting things down a little finer than we hope to do, to educate the dairymen to keep their milk at a temperature that is safe to prevent the lactic acid ferment from developing yet high enough to ripen it just right for the use of the makers. In the first place, sixty-eight degrees Fahrenheit is too low to ripen the night's milk sufficiently for best results in cheese-making.

When we used to care for the milk at the factory we left it at seventy-two to seventy-four degrees Fahrenheit, and it was then not sufficiently ripened for our use. With proper care of utensils, and everything that milk comes in contact with at the farm, it will not be over ripe if thoroughly aired and not allowed to go below atmospheric temperature. Our rennet test, which requires only about three minutes to operate, gives us the exact stage of ripeness, and in this way we determine whether a starter is needed or not. The test is made as follows: The milk in the vat is heated to eighty-four degrees; of this eleven ounces, fluid measure, is placed in a tin cup and one cubic centimeter of rennet extract is added and incorporated by stirring. The cup is allowed to float in the vat of milk from which the sample has been taken to keep the temperature the same as the whole mass in the vat. The temperature when the rennet is added is noted, and, also, the time when the milk begins to coagulate. If the milk thickens in about one minute from the time the rennet is added we consider it sufficiently ripened to add the rennet to the whole mass, but if it requires from one and one-half to three minutes we must either hold the milk at the temperature named until it does respond to the test or we must add starter enough to produce a lactic acid development in about one hour after we have reached the temperature necessary to expel the moisture. My experience teaches me that to hold milk to ripen develops other ferments at the same time which are very objectionable to cheese, making the safest and best way first, to make a careful test for ripeness, or if not sufficient add a quantity of clean sour milk, prepared expressly for this purpose, and after it has been thoroughly incorporated with the whole mass of milk add the rennet and proceed with the process of cheese-making. To hold the milk after the starter has been added until it responds to the rennet test is a little dangerous from the fact that the development goes on faster where starter is used, than without it, therefore it is not safe to wait long before adding the rennet when starter is used. The apparatus required for carrying out the above rennet test is simple and inexpensive. An ordinary lemonade shaker, holding about a pint, may be used. A glass pipette, valued at ten cents, to measure the rennet extract in, can be obtained from any

house selling chemical apparatus. This method of ascertaining the degree of ripeness in milk when intelligently used is a marked improvement over the old way of guessing, or paying no attention whatever to the very important part of ripening milk, before proceeding with the cheese-making process.

We spent the balance of the month of July in the county of Chautauqua, and the makers were all highly pleased with the rennet test. In the full-cream cheese factories, either single or combinations, we found some very fine cheese. Many of them are making a so-called soft cheese for home consumption. One factory we visited was making for the Cleveland, Ohio, market. He claimed that they were giving good satisfaction, at least they were not returning any bills for rejected cheese. They called them soft. They were far from it. The milk was perfectly sweet, full of bad odors, and to prevent making a hard cheese he was making them very porous, and with it was an objectionable flavor. Such goods put on the Boston, Philadelphia, or New York city market would not be accepted. Mr. Morgan remained with him the next day and made a soft, close, dry cheese that drew a solid plug, yet it contained all the fats possible to be retained in a cheese, and what moisture was retained was thoroughly assimilated, so the flavor would not get bad, and the quality would continue to improve as the curing process went on. His first step was to ripen his milk. I gave instructions same day in the Bemus Point factory. I found among the creameries of that county the competition very sharp, and the result was that the dairymen were very negligent in giving their milk proper care. It appeared to me that in competing for milk the proprietors were diffident about insisting upon a system being practical that would secure clean, sweet, pure milk. They being paid by the hundred pounds for manufacturing the butter, let the loss sustained by the poor condition milk fall on the dairymen themselves. In one factory I could hardly secure a sample of milk for the fat test before it would become coagulated in the vat before it passed through the cream separator. The cream in the vat soon after being separated became so thick and ropey that it would appear like soft soap as it ran over the edge

of the dipper. The buttermilk tested three per cent fat. This was caused by the milk being neglected or abused at home. Can dairymen afford this in these times of sharp competition? Butter fat is too valuable to feed calves and swine. The milk not only came in the worst condition, but it was uniformly of bad quality.

I spent the month of August among the cheesemakers and dairymen of northern New York, giving instructions in cheese-making and operating the Babcock test. During the month of September I assisted Mr. J. H. Berry in becoming familiar with the use of the apparatus for testing milk at factories, as he had been recently appointed milk inspector. We spent some time in making tests with the lactometer, also with the Babcock test, after which, in some cases, we remained at the factory and made the cheese. We found the Babcock tester a very convenient device to have along in determining whether or not to take a sample for chemical analysis. Later in the month I made the cheese at the experimental station at Geneva, N. Y., for the experimental work being conducted by Dr. L. L. Van Slyke, chemist. Early in October, I conducted the same work in the factories of John H. Berry, Spragueville, N. Y. These experiments continued four days. We selected such factories as were situated so samples of milk could be forwarded to our chemist at Geneva, N. Y., and arrive there the same day. October seventeenth, I returned to Geneva to continue the work and remained four days. I spent the last week in September at the State farm, one week at Berry's factory, and another week at the station, making three weeks' time in all that I gave to the experimental work after September first. This being the first work of the kind done in any State in the union or in Canada, we feel that great good is going to come from it. The practical tests we are making of milk in different ways, will throw some light on the subject of tainted milk, its causes, the remedy, etc. The experimental work on tainted milk in particular, was necessarily postponed until September and October, which was too late, as the conditions prevailing in hot weather were not present.

CHEESE INVESTIGATION AND EXPERIMENTS FOR SEPTEMBER.*

The factory experiments in September were not varied from those of the preceding months. The station experiments were devoted to a study of the influence of tainted, aerated, and unaerated milks upon the manufacture of cheese.

In experiments 73 and 77, about 100 pounds of night's milk were placed warm in closed cans and cooled immediately to about 50 degrees F. This was mixed the next morning with about 150 pounds of milk that had been kept in open vessels and similarly cooled and made into cheese alongside of 250 pounds of milk that had been cooled and kept in open vessels. The conditions of manufacture were made uniform. The object of the experiments was to see if the gases of the freshly-drawn normal milk, which give rise to so-called "animal odors," would influence in any way the losses, yield and quality of cheese.

In experiment 75, about 100 pounds of night's milk were placed in vessels which had been improperly cleansed and the milk was left exposed in the stable over night. The milk showed some taint but this was largely overcome by the simultaneous development of acid, producing a condition not unusual in factory milk.

In experiment 80, milk was aerated by being passed through a Baby separator, the cream and skim-milk being mixed together again; this was made into cheese alongside the same amount of milk that had not been aerated in any way. This mode of treatment has been suggested by Dr. S. M. Babcock, of the Wisconsin experiment station and is recommended by him as useful

* These investigations were carried on in co-operation with the New York Agricultural Experiment Station, at Geneva, N. Y. The detailed planning of the work, the chemical analysis and the preparation of the bulletins were performed by the station chemist, or under his immediate direction and supervision. The operation of manufacturing cheese was done by the cheese-making experts of this department. The factory experiments were made as follows: In September at the factory of Mr. G. Merry, Verona, Onondaga county; in October at the factory of Mr. John H. Berry, Spragueville, St. Lawrence county. The cheese-making in September was done by Messrs. Geo. A. Smith and M. T. Morgan; in October by Messrs. W. W. Hall, H. A. Rees and John H. Berry. The cheese-making at the station, was performed as follows: In September by Mr. W. W. Hall; from October eighteenth to twenty-first by Mr. W. W. Hall, and the remaining portion of the month of October by Mr. Geo. A. Smith.

For a discussion of the composition of milk and cheese, of the manufacture of cheese, etc., see report of Geo. A. Smith, in the Eighth Annual Report of New York State Dairy Commissioner, and, also, "Cheese Investigation and Experiments for May," "Cheese Investigation and Experiments for June," "Cheese Investigation and Experiments for July," and "Cheese Investigation and Experiments for August," in this report.

in removing dirt from milk as well as aerating the milk thoroughly.

In experiment 81, the milk was aerated by dipping until it was cooled to 60 degrees Fahrenheit.

As these experiments are only preliminary to a more extended investigation planned for the future, caution must be given in regard to drawing definite conclusions from these few first trials.

Our knowledge of tainted milk is far from exhaustive and is probably more or less inaccurate. There are many varieties of tainted milk, as there are many causes which may produce it. The following are some of the more familiar conditions which, in the experience and observation of dairymen, give rise to taint in milk: First. Unhealthful food and drink, such as partially decayed vegetable or animal matter for food and stagnant polluted water for drink. Second. Abnormal physical conditions of cows which injuriously affect the milk, caused by disease, or by ill treatment such as running, dogging, pounding or by any unusual excitement. Third. Unhealthful sanitary surroundings, such as filthy stables. Fourth. Filthiness in milking, by which excrement is allowed to get into the milk. Fifth. Improperly cleaned dairy utensils, such as milk-pails, milk-cans, strainers, churns, cheese-vats, etc. It may be regarded as an unsettled question whether the mere absorption of an odorous gas or the retention of natural gases in milk, which is otherwise entirely normal, will necessarily produce taint in milk for cheese-making. Our preliminary work indicates that something more than odorous gases must be present in milk to produce such taint. With the present limits of our knowledge in regard to the hidden and various details of tainted milk, we do not feel warranted in making any positive statements, but it is probable that bacteria furnish the basis of taint in milk and that without their introduction and presence we should not succeed in producing the phenomena characteristic of tainted milk.

It is pertinent, in this connection, to state that the food of many of the factory cows, whose milk was used for the September experiments, consisted partly of sweet corn husks and cobs obtained from a canning factory; these were frequently somewhat fermented and sour, and the tendency of the milk was to produce floating curd accompanied by an increased loss of fat in the whey.

ANALYSES OF MILK, WHEY AND CHEESE.

SEPTEMBER, 1892.	COMPOSITION EXPRESSED IN PARTS PER HUNDRED.							FROM ONE HUNDRED POUNDS OF MILK.							
	Per cent of water.	Per cent of total solids.	Per cent of fat.	Per cent of caseine and albumen.	Per cent of caseine.	Per cent of albumen.	Per cent of sugar, ash, etc.	Pounds.	Pounds of water.	Pounds of total solids.	Pounds of fat.	Pounds of caseine and albumen.	Pounds of caseine.	Pounds of albumen.	Pounds of sugar, ash, etc.
No. 62—September 1:															
Milk	87.58	12.42	3.75	3.07	2.47	0.60	5.60	100	87.58	12.42	3.75	3.07	2.47	0.60	5.60
Whey	93.41	6.59	0.35	0.80	.....	.....	5.44	90.13	84.19	5.94	0.32	0.73	.....	.....	4.90
Green cheese	85.11	64.89	36.05	24.07	21.61	2.26	4.77	9.87	3.47	6.40	3.56	2.38	2.15	0.33	0.46
No. 63—September 1:															
Milk	87.48	12.52	3.80	3.13	2.49	0.64	5.59	100	87.48	12.52	3.80	3.13	2.49	0.64	5.59
Whey	93.19	6.81	0.38	0.85	.....	.....	5.58	90.37	84.22	6.15	0.34	0.77	.....	.....	5.04
Green cheese	94.46	65.54	36.79	24.38	21.82	2.56	4.37	9.63	3.32	6.31	3.54	2.35	2.10	0.25	0.43
No. 64—September 2:															
Milk	87.80	12.20	3.55	3.09	2.51	0.58	5.56	100	87.80	12.20	3.55	3.09	2.51	0.58	5.56
Whey	93.57	6.43	0.40	0.81	.....	.....	5.22	90.85	84.54	5.81	0.36	0.73	.....	.....	4.72
Green cheese	37.00	63.00	34.52	24.55	22.38	2.17	3.93	9.65	3.57	6.03	3.33	2.37	2.16	0.21	0.36
No. 65—September 2:															
Milk	87.34	12.66	3.95	3.08	2.51	0.57	5.63	100	87.34	12.66	3.95	3.08	2.51	0.57	5.63
Whey	93.26	6.72	0.45	0.84	.....	.....	5.43	90.05	84.00	6.05	0.41	0.76	.....	.....	4.88
Green cheese	36.33	63.67	36.12	24.30	22.50	1.80	3.25	9.36	3.61	6.34	3.59	2.42	2.24	0.18	0.33
No. 66—September 2:															
Milk	87.70	12.30	3.70	3.07	2.49	0.58	5.53	100	87.70	12.30	3.70	3.07	2.49	0.58	5.53
Whey	93.52	6.48	0.41	0.83	.....	.....	5.24	90.30	84.45	5.85	0.37	0.75	.....	.....	4.73
Green cheese	35.64	64.36	36.30	24.90	22.97	1.93	3.26	9.70	3.46	6.24	3.51	2.42	2.23	0.19	0.31
No. 67—September 3:															
Milk	87.55	12.45	3.80	3.07	2.50	0.57	5.58	100	87.55	12.45	3.80	3.07	2.50	0.57	5.58
Whey	93.38	6.62	0.38	0.82	.....	.....	5.43	90.16	84.19	5.97	0.34	0.74	.....	.....	4.89
Green cheese	37.55	62.45	36.31	23.90	21.94	2.66	3.24	9.84	3.69	6.15	3.47	2.35	2.09	0.26	0.33
No. 68—September 3:															
Milk	87.24	12.76	3.90	3.18	2.58	0.60	5.68	100	87.24	12.76	3.90	3.18	2.58	0.60	5.68
Whey	93.23	6.72	0.38	0.85	.....	.....	5.49	90.10	84.05	6.05	0.34	0.77	.....	.....	4.94
Green cheese	35.70	64.30	36.54	24.60	22.65	1.95	3.16	9.90	3.53	6.37	3.64	2.43	2.24	0.19	0.30

No.	Month	Milk	Whey	Green cheese	87.30	12.70	3.85	3.14	2.56	0.58	5.71	Milk	Whey	Green cheese	100	87.30	12.70	3.85	3.14	2.56	0.58	5.71
No. 69—September 2:		Milk	Whey	Green cheese	87.30	12.70	3.85	3.14	2.56	0.58	5.71	Milk	Whey	Green cheese	100	87.30	12.70	3.85	3.14	2.56	0.58	5.71
No. 70—September 5:		Milk	Whey	Green cheese	87.44	12.56	3.80	3.11	2.50	0.61	5.65	Milk	Whey	Green cheese	100	87.44	12.56	3.80	3.11	2.50	0.61	5.65
No. 71—September 5:		Milk	Whey	Green cheese	87.27	12.73	3.90	3.18	2.61	0.57	5.65	Milk	Whey	Green cheese	100	87.27	12.73	3.90	3.18	2.61	0.57	5.65
No. 72—September 5:		Milk	Whey	Green cheese	87.28	12.74	3.85	3.22	2.58	0.64	5.67	Milk	Whey	Green cheese	100	87.28	12.74	3.85	3.22	2.58	0.64	5.67
No. 73—September 26:		Milk	Whey	Green cheese	88.84	13.16	4.30	3.32	2.57	0.75	5.54	Milk	Whey	Green cheese	100	88.84	13.16	4.30	3.32	2.57	0.75	5.54
No. 74—September 26:		Milk	Whey	Green cheese	88.97	13.08	4.25	3.25	2.50	0.75	5.53	Milk	Whey	Green cheese	100	88.97	13.08	4.25	3.25	2.50	0.75	5.53
No. 75—September 27:		Milk	Whey	Green cheese	87.00	13.00	4.40	3.40	2.58	0.82	5.30	Milk	Whey	Green cheese	100	87.00	13.00	4.40	3.40	2.58	0.82	5.30
No. 76—September 27:		Milk	Whey	Green cheese	87.13	12.87	4.10	3.20	2.55	0.65	5.57	Milk	Whey	Green cheese	100	87.13	12.87	4.10	3.20	2.55	0.65	5.57
No. 77—September 26:		Milk	Whey	Green cheese	87.10	12.90	4.00	3.29	2.64	0.65	5.61	Milk	Whey	Green cheese	100	87.10	12.90	4.00	3.29	2.64	0.65	5.61
No. 78—September 28:		Milk	Whey	Green cheese	87.20	12.80	4.00	3.26	2.60	0.66	5.54	Milk	Whey	Green cheese	100	87.20	12.80	4.00	3.26	2.60	0.66	5.54

ANALYSES OF MILK, WHEY AND CHEESE -- (Concluded).

SEPTEMBER, 1892	COMPOSITION EXPRESSED IN PARTS PER HUNDRED.										FROM ONE HUNDRED POUNDS OF MILK.					Pounds of ash, etc.
	Per cent of water.	Per cent of total solids	Per cent of fat.	Per cent of caseine and albumen.	Per cent of caseine.	Per cent of albumen.	Per cent of sugar, ash, etc.	Pounds.		Per cent of water.	Pounds of total solids	Pounds of fat.	Pounds of caseine and albumen.	Pounds of caseine.	Pounds of albumen.	
No. 79 - September 20:																
Milk.....	87.12	12.86	4.15	8.26	9.57	0.69	5.47	100	Milk.....	87.12	12.84	4.15	8.36	9.57	0.69	5.47
Whey.....	93.30	6.70	0.31	0.87	.....	.....	5.52	89.16	Whey.....	93.19	6.81	0.25	0.73	.....	.....	4.91
Green cheese.....	85.29	14.71	36.08	23.34	22.07	1.27	4.20	10.54	Cheese.....	83.91	16.09	3.91	2.63	2.50	0.14	0.47
No. 80 - September 23:																
Milk.....	87.47	12.53	8.85	8.26	2.56	0.70	5.42	100	Milk.....	87.47	12.53	8.85	8.26	2.56	0.70	5.42
Whey.....	93.16	6.84	0.33	0.91	.....	.....	5.60	89.5	Whey.....	93.43	6.57	0.30	0.81	.....	.....	5.03
Green cheese.....	80.56	19.45	34.00	23.65	22.58	1.27	4.60	10.14	Cheese.....	83.86	16.14	3.61	2.11	2.15	0.14	0.48
No. 81 - September 30:																
Milk.....	87.44	12.56	8.90	8.14	2.55	0.69	5.52	100	Milk.....	87.11	12.76	8.90	8.14	2.55	0.69	5.52
Whey.....	93.30	6.61	0.41	0.86	.....	.....	5.31	89.16	Whey.....	93.87	6.13	0.37	0.77	.....	.....	4.75
Green cheese.....	85.49	14.51	32.93	22.71	21.26	1.45	5.87	10.84	Cheese.....	84.17	15.83	3.67	2.30	2.30	0.10	0.64
No. 82 - September 30:																
Milk.....	87.48	12.52	8.85	8.28	2.49	0.74	5.44	100	Milk.....	87.48	12.72	8.85	8.28	2.49	0.74	5.44
Whey.....	93.22	6.78	0.40	0.89	.....	.....	5.49	89.00	Whey.....	92.90	6.83	0.36	0.79	.....	.....	4.88
Green cheese.....	83.88	16.12	32.80	22.64	21.05	1.50	5.23	11.00	Cheese.....	84.35	15.65	3.65	2.49	2.32	0.17	0.64

TABULATED STATEMENT OF THE PRINCIPAL CONDITIONS OF MANUFACTURE.

NUMBER OF EXPERIMENT.	Date.	Kind of cheese made	Pounds of milk used.	Pounds of green cheese made.	Temperature of milk when rennet was added.	Ounces of rennet extract used per 1,000 lbs. of milk.	Time required for milk to begin to thicken	Time from adding rennet to cutting curd.	Condition of curd when cut	Temperature to which curd was heated after cutting, etc.	Time taken to heat to 88 degrees F. or more.	Time from reaching required temperature to drawing whey.	Time from drawing whey to salting.	Ounces of salt used for each pound of fat in milk.	Time from salting to putting in press.	Time of whole operation.
					Fahr. degrees		Mins.	Mins.		Fahr. degrees	Min.	Min.	Min.		Min.	Hrs. Min.
62	1892. Sept. 1	Cheddar....	4,135	408	83	*5	19	33	Ordinary...	98	74	90	230	1.11	30	9 20
63	Sept. 1	Stirred-curd	4,159	401	83	*5	17	28	Ordinary...	93	64	164	25	1.16	140	8 40
64	Sept. 2	Cheddar....	4,013	388	84	3	14	24	Ordinary...	98	77	92	183	1.17	15	8 06
65	Sept. 2	Cheddar....	4,009	399	84	3	15	26	Ordinary...	98	71	115	210	1.05	15	8 00
66	Sept. 2	Cheddar....	4,008	389	84	3	15	24	Ordinary...	98	70	100	220	1.12	15	8 45
67	Sept. 3	Cheddar....	4,125	406	84	3	16	34	Soft.....	98	85	165	180	1.10	20	7 30
68	Sept. 3	Cheddar....	4,011	397	84	3	16	35	Hard.....	98	70	160	125	1.07	20	8 25
69	Sept. 3	Stirred-curd	3,758	383	84	3 1/4	16	27	Ordinary...	98	61	204	20	1.14	110	7 28
70	Sept. 5	Cheddar....	3,883	387	84	3	15	33	Ordinary...	98	69	145	120	1.10	15	8 15
71	Sept. 5	Cheddar....	3,973	409	84	4 1/4	11	26	Ordinary...	98	85	180	145	1.07	15	9 10
72	Sept. 5	Cheddar....	3,858	396	84	6	8	23	Ordinary...	98	66	155	150	1.08	16	8 35
73	Sept. 26	Cheddar....	250	26.60	85	3	20	29	Ordinary...	100	51	120	110	0.93	20	8 30
74	Sept. 26	Cheddar....	250	27.60	86	3	20	28	Ordinary...	100	51	125	107	0.94	18	8 30
75	Sept. 27	Cheddar....	250	29.90	85	3	8	6	Ordinary...	101	24	10	73	0.91	12	8 00
76	Sept. 27	Cheddar....	250	27.10	86	3	24	31	Ordinary...	101	35	180	120	0.98	10	10 10
77	Sept. 28	Cheddar....	250	27.70	85	3	16	27	Ordinary...	100	25	165	110	1.00	20	15 15
78	Sept. 28	Cheddar....	250	27.50	85	3	17	26	Ordinary...	100	25	175	120	1.06	20	45 45
79	Sept. 29	Cheddar....	250	27.10	86	3	15	25	Ordinary...	101	25	190	115	0.96	20	00 00
80	Sept. 29	Cheddar....	250	26.10	86	3	16	24	Ordinary...	101	25	180	120	1.04	10	15 15
81	Sept. 30	Cheddar....	250	27.10	88	3	10	20	Ordinary...	100	20	75	90	1.02	5	80 30
82	Sept. 30	Cheddar....	250	27.50	88	3	18	25	Ordinary...	100	20	80	90	1.04	5	40 40

* German extract in 62 and 63; Hansen's extract in all others.

Statement of Results.

1. Time required for milk to begin to thicken after addition of rennet.

a. Factory experiments.—The time varied from eight to nineteen minutes, and averaged about fifteen minutes.

b. Station experiments.—The time varied from three to twenty minutes, and averaged about fifteen minutes.

2. Time from adding rennet to cutting curd.

a. Factory experiments.—The time varied from twenty-three to fifty-five minutes, and averaged about thirty minutes.

b. Station experiments.—The time varied from six to thirty-one minutes, and averaged twenty-four minutes.

3. Time required to heat to 98 degrees F. or more after cutting and stirring curd.

a. Factory experiments.—The time varied from sixty-one to eighty-five minutes, and averaged about seventy-two minutes.

b. Station experiments.—The time varied from twenty to fifty-one minutes, and averaged about thirty minutes.

4. Time from reaching 98 degrees F. or more to drawing whey.

a. Factory experiments.—The time varied from ninety to 204 minutes, and averaged 143 minutes.

b. Station experiments.—The time varied from ten to 180 minutes, and averaged 119 minutes.

5. Time from drawing whey to salting curd.

a. Factory experiments.—The time varied from 120 to 230 minutes in the Cheddar process, averaging 170 minutes; in the stirred-curd process the time was twenty-five minutes.

b. Station experiments.—The time varied from seventy-three to 120 minutes, and averaged 106 minutes in the Cheddar process.

6. Time occupied by the whole operation of cheese-making.

a. Factory experiments.—The time varied from seven hours and twenty-eight minutes to over nine hours, and averaged about eight hours and thirty minutes.

b. Station experiments.—The time varied from three hours to seven hours and forty-five minutes, and averaged about six hours and twenty minutes.

For explanation of data in the various tables following, see "Cheese Investigation and Experiments for May," in this report.

LOSS OF MILK-CONSTITUENTS IN CHEESE-MAKING.

Amount of Fat Recovered and Lost in Cheese-making.

TABLE SHOWING AMOUNT OF FAT RECOVERED AND LOST IN
CHEESE-MAKING.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of fat lost in whey for 100 lbs. of milk.	Pounds of fat recovered in cheese for 100 lbs. of milk.	Per cent of fat in milk lost in whey.	Per cent of fat in milk recovered in che-ese.
64.....	3.55	0.36	3.19	10.14	89.86
66.....	3.70	0.37	3.33	10.00	90.00
62.....	3.75	0.32	3.43	8.53	91.47
63.....	3.80	0.34	3.46	8.95	91.05
67.....	3.80	0.34	3.46	8.95	91.05
70.....	3.80	0.35	3.45	9.21	90.79
69.....	3.85	0.34	3.51	18.83	91.17
72.....	3.85	0.36	3.49	9.35	90.65
68.....	3.90	0.34	3.56	8.72	91.28
71.....	3.90	0.30	3.60	7.69	92.31
65.....	3.95	0.41	3.54	10.38	89.62
80.....	3.85	0.30	3.55	7.78	92.21
82.....	3.85	0.36	3.49	9.35	90.65
81.....	3.90	0.37	3.53	9.49	90.51
77 ...	4.00	0.23	3.77	5.75	94.25
78.....	4.00	0.27	3.73	6.75	93.25
76.....	4.10	0.37	3.73	9.02	90.98
79.....	4.15	0.28	3.87	6.75	93.25
74.....	4.25	0.30	3.95	7.06	92.94
73.....	4.30	0.31	3.99	7.21	92.79
75.....	4.40	0.41	3.99	9.32	90.68

Statement of Results.

1. Pounds of fat in 100 pounds of milk.

a. Factory experiments. The milk-fat varied from 3.55 to 3.95 pounds in 100 pounds of milk, and averaged 3.81 pounds.

b. Station experiments.—The milk-fat varied from 3.85 to 4.40 pounds in 100 pounds of milk, and averaged 4.03 pounds.

2. Pounds of fat lost for 100 pounds of milk.

a. Factory experiments.—The amount of fat lost in the whey varied from 0.30 to 0.41 pounds for each 100 pounds of milk, and averaged nearly 0.35 pounds. This comparatively large loss was undoubtedly due to the use of canning-factory refuse for food, as already suggested.

b. Station experiments.—The amount of fat lost in the whey varied from 0.23 to 0.41 pounds for each 100 pounds of milk, and averaged 0.32 pounds.

3. Per cent of fat in milk lost in whey.

a. Factory experiments.—The per cent of milk-fat that was lost varied from 7.69 to 10.38 per cent, and averaged 9.19 per cent of the fat in the milk.

b. Station experiments.—The per cent of milk-fat lost varied from 5.75 to 9.49 per cent, and averaged 7.84 per cent of the fat in the milk.

4. Comparison of stirred-curd and Cheddar processes with reference to loss of fat.

a. Factory experiments.—In experiments 62 and 68 the Cheddar process was employed, and in experiments 63 and 69, made the same days, the stirred-curd process was used. The loss of fat was practically the same in both cases.

5. Influence of cutting curd in hard and soft condition upon loss of fat.

a. Factory experiments.—In experiment 68 the curd was cut hard; in experiment 67 it was cut soft. The proportion of fat lost was a trifle less in case of the hard cutting, being as 8.72 to 8.95 per cent of the fat in the milk.

6. Influence of using different amounts of rennet upon loss of fat.

a. Factory experiments.—In experiment 70 three ounces of rennet extract were used for 1,000 pounds of milk; in 71 four and a quarter ounces, and in 72 six ounces. The loss was about the same when three and six ounces of rennet were used, being as 9.26 and 9.35 per cent of the fat in the milk. The loss was least when three and a quarter ounces of rennet were used.

7. Influence of retaining gases in milk upon loss of fat in cheese-making.

In experiment 73 eighty-five pounds of evening milk were put in a covered can and cooled down to about 50 degrees F., so that none of the gases which produce the characteristic "animal odor" of freshly drawn milk were allowed to escape. The next morning this milk was mixed with 165 pounds of other milk which had been kept in open vessels. In experiment 77 123 pounds of milk were similarly treated, then mixed with 127 pounds of milk kept in

the ordinary way and made into cheese. Parallel with these two experiments, were made cheeses, in experiments 74 to 78, none of which had been kept in closed vessels. The conditions of manufacture were kept as uniform as possible. In experiments 73 and 74, made side by side on the same day, the loss of fat was practically the same. In experiments 77 and 78 the milk which had been shut up gave a slightly smaller loss of fat. No sign of "animal odor" or taint was discernable at any stage of the process of manufacture.

8. Influence of storing milk in unclean vessels upon loss of fat in cheese-making.

For experiment 75 107 pounds of evening milk were placed in vessels which had been used for storing milk and which had been cleansed by rinsing out imperfectly with cold water and then placed in the sun. This milk was then mixed with 143 pounds of milk that had been properly kept. The milk thus treated showed some taint and a very marked degree of acidity. In experiment 76 well-kept milk was used for comparison. The degree of acidity in 75 was so marked that the taint was not very noticeable. It would have been difficult, if not impossible, to work up successfully a large amount of such milk. The difference in loss of fat was not so great as would be expected, being 9.32 per cent of the fat in the milk, while the loss in 76 was 9.02 per cent of the fat in the milk, though the loss was considerably higher than the average.

9. Influence of aerating milk upon loss of fat in cheese-making.

In experiment 80 250 pounds of milk were passed through a Baby Separator No. 2, and the cream and skim-milk were then mixed together and made into cheese. In experiment 79 250 pounds of the same milk as that used in 80, before separating, were made into cheese under the same conditions. In mixing together the cream and skim-milk in experiment 80 it was found that there was a loss of 0.3 pounds of fat for 100 pounds of milk. As regards loss of fat in cheese-making, the loss was a trifle greater in case of the separated milk than in the unseparated milk used in experiment 79.

In experiment 81 the milk was aerated by dipping and pouring until the milk was well cooled. In 82 the milk was not aerated

at all. The loss of fat in the two experiments was practically the same.

10. General summary.

Taking all the milks used in the September experiments, the average amount of fat in 100 pounds of milk was 3.94 pounds; of this fat, about 0.33 pounds (a little over five ounces) or 8.38 per cent of the fat in the milk were lost in the whey for each hundred pounds of milk while 3.61 pounds of fat were recovered in the cheese. The difference in the loss of fat between the highest and lowest amounts was nearly three ounces of fat for each hundred pounds of milk.

Amount of Caseine and Albumen Recovered and Lost in Cheese-making.

TABLE SHOWING AMOUNT OF CASEINE AND ALBUMEN RECOVERED AND LOST IN CHEESE-MAKING.

NUMBER OF EXPERIMENT.	Pounds of caseine and albumen in 100 lbs. of milk.	Pounds of caseine and albumen lost in whey for 100 lbs. of milk.	Pounds of caseine and albumen recovered in cheese for 100 lbs. of milk.	Per cent of caseine and albumen in milk lost in whey.	Per cent of caseine and albumen in milk recovered in cheese.
64.....	3.09	0.73	2.36	23.62	76.38
66.....	3.07	0.75	2.32	24.43	75.57
62.....	3.07	0.72	2.35	23.45	76.55
63.....	3.13	0.77	2.36	24.69	75.40
67.....	3.07	0.74	2.33	24.10	75.90
70.....	3.11	0.70	2.41	22.50	77.50
69.....	3.14	0.76	2.38	24.20	75.80
72.....	3.22	0.76	2.46	23.60	76.40
68.....	3.18	0.77	2.41	24.21	75.79
71.....	3.18	0.74	2.44	23.27	76.73
65.....	3.08	0.76	2.32	24.67	75.33
80.....	3.26	0.81	2.45	24.84	75.16
82.....	3.23	0.79	2.44	24.46	75.54
81.....	3.14	0.77	2.37	24.52	75.48
77.....	3.29	0.83	2.46	25.23	74.77
78.....	3.26	0.83	2.43	25.46	74.54
76.....	3.20	0.76	2.44	23.75	76.25
79.....	3.26	0.78	2.48	23.92	76.08
74.....	3.25	0.77	2.48	23.69	76.31
73.....	3.32	0.77	2.55	23.19	76.81
75.....	3.40	0.77	2.63	22.65	77.35

Statement of Results.

1. Pounds of caseine and albumen in 100 pounds of milk.

a. Factory experiments.—The amount of caseine and albumen in the milk varied from 3.07 to 3.22 pounds in 100 pounds of milk, and averaged 3.12 pounds.

b. Station experiments.—The amount of caseine and albumen in the milk varied from 3.14 to 3.40 pounds in 100 pounds of milk, and averaged 3.26 pounds.

2. Pounds of caseine and albumen lost in whey for 100 pounds of milk.

a. Factory experiments.—The amount of caseine and albumen lost in the whey varied from 0.70 to 0.77 pounds for each hundred pounds of milk, and averaged 0.74 pounds.

b. Station experiments.—The amount of caseine and albumen lost in the whey varied from 0.76 to 0.83 pounds, and averaged 0.79 pounds for 100 pounds of milk.

3. Per cent of caseine and albumen in milk lost in whey.

a. Factory experiments.—The per cent of caseine and albumen that was lost in the whey varied from 22.50 to 24.67 per cent of the caseine and albumen in the milk, and averaged 23.72 per cent.

b. Station experiments.—The per cent of caseine and albumen lost in the whey varied from 22.65 to 25.46 per cent of the caseine and albumen in the milk, with an average of 24.23 per cent.

4. Variation of conditions of manufacture, such as using Cheddar and stirred-curd processes, varying the amount of rennet, cutting curd soft and hard, using unaerated and tainted milk, appeared to influence very little, if at all, the amount of caseine and albumen lost in the whey.

General Summary.

Taking all the September experiments, the amount of caseine and albumen averaged 3.19 pounds in 100 pounds of milk; of this amount, 0.77 pounds (about twelve and one-half ounces), or 24.14 per cent of the caseine and albumen in the milk, were lost in the whey for each hundred pounds of milk, while 2.42 pounds were recovered in the cheese. From the season's experiments it would appear as if the proportion of caseine and albumen lost were quite uniform, being about twenty-four per cent of the amount present in the milk, and this loss is not much influenced by variation of conditions of manufacture, so far as we have yet experimented.

Relation of Caseine and Albumen in Milk — TABLE SHOWING RELATION OF CASEINE TO ALBUMEN IN MILK.

NUMBER OF EXPERIMENT.	Pounds of caseine and albumen in 100 lbs. of milk.	Pounds of caseine in 100 lbs. of milk.	Pounds of albumen in 100 lbs. of milk.	Pounds of caseine for 100 lbs. of caseine and albumen together.	Pounds of albumen for 100 lbs. of caseine and albumen together.	Pounds of caseine for 1 lb. of albumen in milk.
64.....	3.09	2.51	0.58	81.23	18.77	4.3
66.....	3.07	2.4	0.58	81.11	18.89	4.3
62.....	3.07	2.47	0.60	80.46	19.54	4.1
63.....	3.13	2.49	0.64	79.55	20.45	3.9
67.....	3.07	2.50	0.57	81.43	18.57	4.4
70.....	3.11	2.50	0.61	80.39	19.61	4.1
69.....	3.14	2.56	0.58	81.53	18.47	4.4
72.....	3.22	2.58	0.64	80.12	19.88	4.0
68.....	3.18	2.55	0.60	81.13	18.87	4.3
71.....	3.18	2.61	0.57	82.08	17.92	4.6
65.....	.08	2.51	0.57	81.50	18.50	4.4
80.....	3.26	2.6	0.70	78.53	21.47	3.7
82.....	3.23	2.49	0.74	77.09	22.91	3.4
81.....	3.14	2.55	0.59	81.21	18.79	4.3
77.....	3.29	2.64	0.65	80.24	19.76	4.1
78.....	3.26	2.60	0.66	79.75	20.25	3.9
76.....	3.20	2.55	0.65	79.69	20.31	3.9
79.....	3.26	2.57	0.69	78.83	21.17	3.7
74.....	3.25	2.50	0.75	76.92	23.08	3.3
73.....	3.32	2.57	0.75	77.41	22.59	3.4
75.....	.40	2.58	0.82	75.88	24.12	3.1

*Statement of Results.***1. Pounds of caseine and albumen in 100 pounds of milk.**

a. Factory experiments.—The amount of caseine and albumen averaged 3.12 pounds.

b. Station experiments.—The amount of caseine and albumen averaged 3.26 pounds.

2. Pounds of caseine in 100 pounds of milk.

a. Factory experiments.—The caseine varied from 2.47 to 2.61 pounds, and averaged 2.53 pounds in 100 pounds of milk.

b. Station experiments.—The caseine varied from 2.49 to 2.64 pounds and averaged 2.56 pounds in 100 pounds of milk.

3. Pounds of albumen in 100 pounds of milk.

a. Factory experiments.—The amount of albumen varied from 0.57 to 0.64 pounds and averaged 0.59 pounds in 100 pounds of milk.

b. Station experiments.—The albumen varied from 0.59 to 0.82 pounds, and averaged about 0.70 pounds in 100 pounds of milk.

4. Pounds of caseine for one pound of albumen in milk.

a. Factory experiments.—For each pound of albumen in the milk, the caseine varied from 3.9 to 4.6 pounds, and averaged 4.3 pounds.

b. Station experiments.—For each pound of albumen in the milk, the caseine varied from 3.1 to 4.3 pounds, and averaged nearly 3.7 pounds.

5. General summary.

In all the June experiments, the average amount of caseine and albumen was 3.19 pounds in 100 pounds of milk; of this amount, about 2.54 pounds, or 79.62 per cent, consisted of caseine, while 0.65 pounds, or 20.38 per cent, consisted of albumen. There were, on an average, 3.9 pounds of caseine to one pound of albumen.

INFLUENCE OF COMPOSITION OF MILK ON COMPOSITION OF CHEESE.

Influence of Fat in Milk on Composition of Cheese.

TABLE SHOWING RELATION OF FAT IN MILK TO FAT IN CHEESE.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of fat in 100 lbs. of water-free cheese.	Pounds of fat in 100 lbs. of water-free cheese for one lb. of fat in milk.
64.....	3.55	54.8	15.4
66.....	3.70	56.2	15.2
62.....	3.75	55.5	14.8
63.....	3.80	56.1	14.8
67.....	3.80	56.5	14.9
70.....	3.80	55.5	14.6
69.....	3.85	57.5	14.9
72.....	3.85	55.1	14.3
68.....	3.90	56.8	14.6
71.....	3.90	55.7	14.3
65.....	3.95	56.7	14.4
80.....	3.85	54.9	14.3
82.....	3.85	53.7	14.0
81.....	3.90	53.5	13.7
77.....	4.00	55.8	13.9
78.....	4.00	55.8	13.9
76.....	4.10	55.4	13.5
79.....	4.15	56.6	13.6
74.....	4.25	56.5	13.3
73.....	4.30	57.0	13.3
75.....	4.40	56.2	13.0

Statement of Results.

1. Amount of fat in 100 pounds of milk.

a. Factory experiments.—The fat varied from 3.55 to 3.95 pounds, and averaged 3.81 pounds in 100 pounds of milk.

b. Station experiments.—The fat varied from 3.85 to 4.40 pounds, and averaged 4.08 pounds in 100 pounds of milk.

2. Amount of fat in 100 pounds of water-free cheese.

a. Factory experiments.—The fat varied from 54.8 to 57.5 pounds, and averaged 56 pounds in 100 pounds of water-free cheese.

b. Station experiments.—The fat varied from 53.5 to 57 pounds, and averaged 55.5 pounds in 100 pounds of water-free cheese.

3. Pounds of fat in 100 pounds of cheese for one pound of fat in milk.

a. Factory experiments.—For each pound of fat in milk there were in 100 pounds of cheese from 14.3 to 15.4 pounds of fat, with an average of 14.7 pounds.

b. Station experiments.—For each pound of fat in milk there were in 100 pounds of cheese from 13 to 14.3 pounds of fat, with an average of 13.6 pounds.

Influence of Caseine and Albumen in Milk on Composition of Cheese.

TABLE SHOWING RELATION OF CASEINE AND ALBUMEN IN MILK TO CASEINE AND ALBUMEN IN CHEESE.

NUMBER OF EXPERIMENT.	Pounds of caseine and albumen in 100 lbs of milk.	Pounds of caseine and albumen in 100 lbs. of water-free cheese.	Ratio of caseine and albumen in milk to caseine and albumen in cheese.	Pounds of fat for one lb. of caseine and albumen in milk.
64	3.09	38.9	12.9	1.15
66	3.07	38.7	12.6	1.21
62	3.07	37.1	12.1	1.22
63	3.13	37.2	11.9	1.21
67	3.07	38.3	12.5	1.24
70	3.11	38.0	12.2	1.22
69	3.14	38.5	12.3	1.23
72	3.22	38.2	11.9	1.20
68	3.18	38.3	12.0	1.23
71	3.18	37.4	11.8	1.23
65	3.08	38.1	12.3	1.28
80	3.26	38.0	11.7	1.18
82	3.23	37.6	11.6	1.19
81	3.14	37.0	11.8	1.24
77	3.29	36.3	11.0	1.22
78	3.26	36.1	11.1	1.23
76	3.20	36.7	11.4	1.28
79	3.26	36.6	11.2	1.27
74	3.25	36.2	11.1	1.31
73	3.32	36.7	11.1	1.30
75	3.40	37.6	11.1	1.29

Statement of Results.

1. Pounds of caseine and albumen in 100 pounds of milk.

a. Factory experiments.—The amount of caseine and albumen varied from 3.07 to 3.22 pounds, and averaged 3.12 pounds in 100 pounds of milk.

b. Station experiments.—The amount of caseine and albumen varied from 3.14 to 3.40 pounds, and averaged 3.26 pounds.

2. Pounds of caseine and albumen in 100 pounds of water-free cheese.

a. Factory experiments.—The amount of caseine and albumen varied from 37.1 to 38.9 pounds in 100 pounds of water-free cheese, and averaged 38.1 pounds.

b. Station experiments.—The amount of caseine and albumen in 100 pounds of water-free cheese varied from 36.1 to 38 pounds, and averaged 36.9 pounds.

3. Pounds of caseine and albumen in 100 pounds of cheese for one pound of caseine and albumen in milk.

a. Factory experiments.—The ratio varied from 11.8 to 12.9, and averaged 12.2.

b. Station experiments.—The ratio varied from 11 to 11.8, and averaged 11.3.

Relation of Fat to Caseine and Albumen in Cheese as a Basis for Determining the Character of Milk.

TABLE SHOWING RELATION OF FAT TO CASEINE AND ALBUMEN IN
CHEESE.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 pounds of milk.	Pounds of fat in 100 pounds of water-free cheese.	Pounds of caseine and albumen in 100 pounds of water-free cheese.	Pounds of fat for one pound of caseine and al- bumen in water- free cheese.
64.....	3.55	54.8	38.9	1.41
66.....	3.70	56.2	38.7	1.45
62.....	3.75	55.5	37.1	1.50
63.....	3.80	56.1	37.2	1.51
67.....	3.80	56.5	38.3	1.48
70.....	3.80	55.5	38.0	1.46
69.....	3.85	57.5	38.5	1.49
72.....	3.85	55.1	38.2	1.44
68.....	3.90	56.8	38.3	1.48
71.....	3.90	55.7	37.4	1.50
65.....	3.95	56.7	38.1	1.49
80.....	3.85	54.9	38.0	1.44
82.....	3.85	53.7	37.6	1.43
81.....	3.90	53.5	37.0	1.45
77.....	4.00	55.8	36.3	1.54
78.....	4.00	55.8	36.1	1.54
76.....	4.10	55.4	36.7	1.51
79.....	4.15	56.6	36.6	1.55
74.....	4.25	56.5	36.2	1.56
73.....	4.30	57.0	36.7	1.55
75.....	4.40	56.2	37.6	1.50

Statement of Results.

a. Factory experiments.—For each pound of caseine and albumen in the water-free cheese there were from 1.41 to 1.51 pounds of fat, with an average of 1.47 pounds.

b. Station experiments.—The fat varied from 1.43 to 1.56 pounds, and averaged 1.50 pounds for each pound of caseine and albumen in the cheese. The milks were all normal in both the factory and station experiments.

INFLUENCE OF COMPOSITION OF MILK ON YIELD OF CHEESE.

TABLE SHOWING RELATION OF MILK-CONSTITUENTS TO YIELD OF CHEESE.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of caseine and albumen in 100 lbs. of milk.	Pounds of green cheese made from 100 lbs. of milk.	Pounds of water in cheese made from 100 lbs. of milk.	Pounds of fat in cheese made from 100 lbs. of milk.	Pounds of caseine and albumen in cheese made from 100 lbs. of milk.	Pounds of sugar, ash, etc.
64	3.55	3.09	9.65	3.57	3.33	2.37	0.38
66	3.70	3.07	9.70	3.46	3.51	2.42	0.31
62	3.75	3.07	9.87	3.47	3.56	2.38	0.46
63	3.80	3.13	9.63	3.32	3.54	2.35	0.42
67	3.80	3.07	9.84	3.69	3.47	2.35	0.33
70	3.80	3.11	9.97	3.65	3.51	2.40	0.41
69	3.85	3.14	10.19	3.87	3.53	2.44	0.35
72	3.85	3.22	10.00	3.54	3.56	2.47	0.43
80	3.85	3.26	10.44	3.86	3.61	2.49	0.48
82	3.85	3.23	11.00	4.38	3.55	2.49	0.58
68	3.90	3.18	9.90	3.53	3.64	2.43	0.30
71	3.90	3.18	10.29	3.85	3.60	2.41	0.43
81	3.90	3.14	10.84	4.17	3.57	2.46	0.64
65	3.95	3.08	9.95	3.61	3.59	2.42	0.33
77	4.00	3.29	11.04	4.23	3.80	2.47	0.54
78	4.00	3.26	11.00	4.26	3.76	2.43	0.55
76	4.10	3.20	10.84	4.07	3.75	2.48	0.54
79	4.15	3.26	10.84	3.93	3.91	2.53	0.47
74	4.25	3.25	11.04	4.01	3.97	2.55	0.51
73	4.30	3.32	10.64	3.69	3.96	2.55	0.44
75	4.40	3.40	11.96	4.86	3.99	2.67	0.44

Yield of Green Cheese from 100 Pounds of Milk.

Statement of Results.

1. Pound of cheese made from 100 pounds of milk.

a. Factory experiments.—The yield of cheese from 100 pounds of milk varied from 9.36 to 10.29 pounds, and averaged 9.91 pounds.

b. Station experiments.—The yield varied from 10.44 to 11.96 pounds, and averaged 10.96 pounds.

2. Influence of stirred-curd and Cheddar processes upon yield of cheese.

NUMBER OF EXPERIMENT.	Process.	Pounds of cheese made from 100 lbs. of milk.
62.....	Cheddar	9.87
63.....	Stirred-curd	9.63
68.....	Cheddar	9.90
69.....	Stirred-curd	10.19

In one case the Cheddar process made 0.24 pounds more of cheese; while in the other case the stirred-curd process made 0.29 pounds more. The larger yield was in both cases due mainly to the additional amount of moisture retained. In experiment 69 the maker aimed to hold as much moisture as the Cheddar in 68, and he succeeded in holding considerable more. The conditions of manufacture were, therefore, not alike.

3. Influence of cutting curd in hard and soft condition upon yield of cheese.

NUMBER OF EXPERIMENT.	Condition of curd when cut.	Pounds of cheese made from 100 lbs. of milk.
68.....	Hard	9.90
67.....	Soft	9.84

The soft-cut curd made less cheese, which was, in part, due to difference in composition of milk.

4. Influence of aerating milk, retaining gases in milk and storing milk in unclean vessels, upon yield of cheese.

In the few preliminary experiments made, the difference in yield, when any existed, was mainly due to difference of moisture retained and difference in composition of milk used. Aeration of milk by separator produced a diminished yield.

Amount of Water Retained in Cheese made from 100 Pounds of Milk.

1. Average of results.

Taking all the experiments of September, the water retained in the cheese made from 100 pounds of milk varied from 3.32 to 4.86 pounds, and averaged 3.86 pounds. Some of the more marked variations were due to especial conditions of manufacture, which we will now examine.

2. Influence of stirred-curd and Cheddar processes upon amount of water retained in cheese.

NUMBER OF EXPERIMENT.	Process	Pounds of water in cheese made from 100 lbs. of milk.
62.....	Cheddar	3.47
63.....	Stirred-curd	3.32
68.....	Cheddar	3.53
69.....	Stirred-curd	3.87

It will be seen that, in one case, the Cheddar process retained more water, while, in the other, the stirred-curd process retained more water. As previously stated, experiments 68 and 69 do not fairly represent a comparison between the Cheddar and stirred-curd processes, since, in the latter, the conditions of manufacture were made to vary in such a way as to hold more moisture.

3. Influence of cutting curd in hard and soft condition upon amount of water retained in cheese.

NUMBER OF EXPERIMENT.	Condition of curd when cut	Pounds of water in cheese made from 100 lbs. of milk.
68.....	Hard	3.53
67.....	Soft	3.69

The hard-cut curd retained less moisture than the soft-cut curd.

Amount of Fat Retained in Cheese made from 100 Pounds of Milk.

Statement of Results.

Grouping and averaging results, we have the following table:

NUMBER OF EXPERIMENT	Pounds of fat in 100 lbs. of milk.	Pounds of fat in cheese made from 100 lbs of milk.	Increase of fat in 100 lbs. of milk.	Increase of fat in cheese made from 100 lbs. of milk.
64	3.55	3.33	.....	.....
66	3.70	3.51	0.15	0.15
62	3.75	3.56	0.20	0.20
63, 67, 70	3.80	3.50	0.25	0.17
69, 72, 70, 82.....	3.85	3.56	0.30	0.23
68, 71, 81	3.90	3.60	0.35	0.27
65	3.95	3.59	0.40	0.26
77, 78	4.00	3.78	0.45	0.45
76	4.10	3.75	0.55	0.42
79	4.15	3.91	0.60	0.58
74	4.25	3.97	0.70	0.64
73	4.30	3.96	0.75	0.63

An examination of the last two columns in the preceding table indicates that when the fat in the milk increased the amount of fat retained in the cheese increased also, and, as a rule, followed quite closely the increase of fat in the milk even in spite of marked variations in conditions of manufacture.

Amount of Caseine and Albumen Retained in Cheese made from 100 Pounds of Milk.

Statement of Results.

Taking all the experiments of September, the caseine and albu-
men varied from 3.07 to 3.40 pounds in 100 pounds of milk, while
the caseine and albumen retained in the cheese made from 100
pounds of milk varied from 2.35 to 2.67 pounds. This indicates
pretty close uniformity in respect to the amount of caseine and
albumen of the milk retained in the cheese even when the con-
ditions of manufacture vary considerably.

Influence of Different Milk-Constituents in Increasing Yield of Cheese.

TABLE SHOWING INFLUENCE OF DIFFERENT MILK-CONSTITUENTS IN INCREASING YIELD OF CHEESE.

NUMBER OF EXPERIMENT.	YIELD OF CHEESE FROM 100 POUNDS OF MILK.		POUNDS OF FAT IN CHEESE MADE FROM 100 POUNDS OF MILK.		POUNDS OF CASEINE AND ALBUMEN IN CHEESE MADE FROM 100 POUNDS OF MILK.		POUNDS OF WATER, ASH, ETC., IN CHEESE MADE FROM 100 POUNDS OF MILK.	
	Increase of yield.	Decrease of yield.	Increase of fat in cheese.	Decrease of fat in cheese.	Increase of caseine and albumen in cheese.	Decrease of caseine and albumen in cheese.	Increase of water, etc., in cheese.	Decrease of water, etc., in cheese.
64 .....	.....	.....	.....	.....	.....	.....	.....	.....
66	0.05	.....	0.18	.....	0.05	.....	.....	0.18
62	0.22	.....	0.23	.....	0.01	.....	.....	0.02
63 .....	.....	0.02	0.21	.....	.....	0.02	.....	0.21
67	0.19	.....	0.14	.....	.....	0.02	0.07	.....
70	0.32	.....	0.18	.....	0.03	.....	0.11	.....
69	0.54	.....	0.20	.....	0.07	.....	0.27	.....
72	0.35	.....	0.23	.....	0.10	.....	0.02	.....
80	0.79	.....	0.28	.....	0.12	.....	0.39	.....
82	1.05	.....	0.22	.....	0.12	.....	1.01	.....
68	0.25	.....	0.31	.....	0.06	.....	.....	0.12
71	0.64	.....	0.27	.....	0.04	.....	0.33	.....
81	1.19	.....	0.24	.....	0.09	.....	0.86	.....
65	0.30	.....	0.26	.....	0.05	.....	.....	0.01
77	1.39	.....	0.47	.....	0.10	.....	0.82	.....
78	1.35	.....	0.43	.....	0.06	.....	0.86	.....
76	1.19	.....	0.42	.....	0.11	.....	0.66	.....
79	1.19	.....	0.58	.....	0.16	.....	0.45	.....
74	1.39	.....	0.64	.....	0.18	.....	0.57	.....
73	0.99	.....	0.63	.....	0.18	.....	0.18	.....
75	2.31	.....	0.66	.....	0.30	.....	1.35	.....

The order of arrangement of experiments in the preceding table is based upon amount of fat in milk, commencing with the lowest. For further explanation see report of Geo. A. Smith, in Eighth Annual Report of the New York State Dairy Commissioner, and "Cheese Investigation and Experiments for May," in this report.

Statement of Results.

1. Influence of fat on yield of cheese.

In every case a portion of the increased yield of cheese was due to fat, varying from 0.14 to 0.66 pounds for 100 pounds of milk. On an average, 42.5 per cent of the increase of yield was due to increase of fat in the cheese.

2. Influence of caseine and albumen on yield of cheese.

a. In experiments 63 and 67 there was a decrease of caseine and albumen in the cheese amounting to 0.02 pounds.

b. In all the other experiments the caseine and albumen contributed to increase in yield of cheese by amounts varying from 0.01 to 0.30 pounds, and averaging about 0.09 pounds.

c. Averaging all the experiments, it is found that 11.25 per cent of the increase in yield was due to increase of caseine and albumen in cheese.

3. Influence of water, ash, etc., on yield of cheese.

a. In five cases there was a decrease of water, ash, etc., varying from 0.01 to 0.21 pounds, and averaging 0.11 pounds.

b. In the other cases there was an increase of water, ash, etc., in the cheese, varying from 0.02 to 1.35 pounds, and averaging 0.37 pounds.

c. Averaging all the experiments, it appears that 46.25 per cent of the increase of yield was due to increase of water, ash, etc., in the cheese.

4. General summary.

Averaging all the experiments, we have the following:

	Pounds.	Percent.
Average increased yield of cheese.....	0.80	.....
Average increased yield of fat	0.34	42.50
Average increased yield of caseine and albumen,	0.06	11.25
Average increased yield of water, etc.....	0.37	46.25

In the September experiments, it appears that over four-tenths of the increase in the yield of cheese were due to increase of fat in the milk; nearly one-half was due to increased retention of water, ash, etc., and about one-tenth was due to increase of caseine and albumen.

Relation of Fat in Milk to Yield of Cheese.

TABLE SHOWING RELATION OF FAT IN MILK TO YIELD OF CHEESE.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of cheese made from 100 lbs. of milk.	Pounds of cheese made for each pound of fat in milk.
64.....	3.55	9.65	2.72
66.	3.70	9.70	2.62
62.	3.75	9.87	2.63
63.....	3.80	9.63	2.53
67.....	3.80	9.84	2.60
70.....	3.80	9.97	2.62
69.....	3.85	10.19	2.65
72.....	3.85	10.00	2.60
68.....	3.90	9.90	2.54
71.....	3.90	10.29	2.64
65.....	3.95	9.95	2.52
80.....	3.85	10.44	2.71
82.....	3.85	11.00	2.86
81.....	3.90	10.84	2.78
77.....	4.00	11.04	2.76
78.....	4.00	11.00	2.67
76.....	4.10	10.84	2.61
79.....	4.15	10.84	2.60
74.....	4.25	11.04	2.54
73.....	4.30	10.64	2.50
75.....	4.40	11.96	2.72

Statement of Results.

1. Pounds of cheese made for each pound of fat in milk.

a. Factory experiments.—The amount of cheese made for each pound of fat in the normal milks varied from 2.52 to 2.92, and averaged 2.60 pounds.

b. Station experiments.—The amount of cheese made for each pound of fat in the milk varied from 2.50 to 2.86 pounds, and averaged 2.69 pounds.

Loss of Cheese in Weight for First Month.

TABLE SHOWING LOSS OF STATION CHEESE IN WEIGHT.

NUMBER OF EXPERIMENT.	Weight of cheese when green.	Weight of cheese when one month old.	Pounds lost in four weeks.	Pounds of loss in weight in four weeks for 100 pounds of cheese.
73	26.60	25.25	1.35	5.08
74	27.60	26.20	1.40	5.07
75	29.90	25.20	4.70	15.70
76	27.10	25.30	1.80	6.64
77	27.60	26.25	1.35	4.90
78	27.50	26.10	1.40	5.09
79	27.10	25.80	1.30	4.80
80	26.10	24.90	1.20	4.60
81	27.10	25.85	1.25	4.61
82	27.50	26.20	1.30	4.73

Statement of Results.

The extremely large amount of loss in experiment 75 was due to the fact that this cheese was made from acid milk and retained over forty per cent of moisture at the start, much of which was lost by leakage in the process of curing. Leaving this out of consideration, the other cheeses lost amounts in weight varying from 4.60 to 6.64 pounds, with an average loss of 5.06 pounds.

TABLE SHOWING COMPARISON OF STATION CHEESE.

NUMBER OF EXPERIMENT.	Kind of cheese.	Date of manufacture.	Special condition of manufacture.	Flavor.	Body.	Texture.	Color.	Appearance.	Total number of marks.	Date of examination.
73	Cheddar....	Sept. 26	Fresh milk kept in closed cans.....	39	24	15	15	5	98	Oct. 28
74	Cheddar..	Sept. 26	Milk in open cans but not aerated.....	40	24	15	15	5	99	Oct. 28
75	Cheddar....	Sept. 27	Milk stored in unclean cans.....	38	22	10	15	3	88	Oct. 28
76	Cheddar....	Sept. 27	Same as 74.....	39	25	15	15	5	99	Oct. 28
77	Cheddar....	Sept. 28	Same as 73.....	40	23	15	15	5	98	Oct. 28
78	Cheddar....	Sept. 28	Same as 74.....	40	25	15	15	5	100	Oct. 28
79	Cheddar....	Sept. 29	Same as 74.....	39	25	15	15	5	99	Oct. 28
80	Cheddar....	Sept. 29	Milk aerated by separator.....	40	25	15	15	5	100	Oct. 28
81	Cheddar....	Sept. 30	Milk aerated by dipping	38	23	15	15	5	96	Oct. 28
82	Cheddar....	Sept. 30	Same as 74.....	40	23	13	15	5	96	Oct. 28

Description of Commercial Qualities of Cheese.

No. 73. Flavor, mild; body, smooth and solid, but somewhat salvy or lacking in firmness, owing to excess of moisture retained; texture, fine and close.

No. 74. Flavor, perfect; body like No. 73; texture, fine and close.

No. 75. Flavor, practically flavorless; body, somewhat harsh and brittle; texture, lacking in firmness and closeness; appearance, mottled and rough, like a leaky cheese. This cheese has the characteristic properties of a cheese made from soured milk.

No. 76. Flavor not quite perfect; body, solid, firm and smooth; texture, fine and close.

No. 77. Flavor, perfect; body, smooth and solid, but salvy, owing to excess of moisture retained; texture, fine and close.

No. 78. Flavor, perfect; body, solid, firm and smooth; texture, fine and close.

No. 79. Flavor, not quite perfect; body, solid, firm and smooth; texture, fine and close.

No. 80. Flavor, perfect; body, solid, firm and smooth; texture, fine and close.

No. 81. Flavor, too acid; body, firm and smooth, rather salvy, owing to excess of moisture retained; texture, fine and close.

No. 82. Flavor, perfect; body, like No. 81; texture, somewhat porous.

1. The milk, part of which was stored in unclean cans over night, produced very inferior cheese.

2. The milk which was placed fresh in closed cans and held over night, in one case, No. 73, showed slightly imperfect flavor; in the other case, No. 77, the flavor was perfect.

3. The cheese made from milk that had been created by separation in centrifugal machine was perfect in every respect.

TABULATED SUMMARY OF RESULTS.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of fat lost in whey for 100 lbs. of milk.	Per cent of fat in milk lost in whey.	Pounds of caseine and albumen in 100 lbs. of milk.	Pounds of caseine and albumen lost in whey for 100 lbs. of milk.	Per cent of caseine and albumen in milk lost in whey.	Pounds of caseine in 100 lbs. of milk.	Pounds of albumen in 100 lbs. of milk.	Pounds of caseine for one pound of albumen in milk.	Pounds of fat for one lb. of caseine and albumen in milk.
64.....	3.55	0.36	11.14	3.09	0.73	23.62	2.51	0.59	4.3	1.15
65.....	3.70	0.37	10.00	3.07	0.75	24.43	2.49	0.58	4.3	1.21
66.....	3.75	0.32	8.53	3.07	0.72	23.45	2.47	0.60	4.1	1.22
67, 70.....	3.80	0.34	8.95	3.10	0.73	23.56	2.50	0.60	4.3	1.23
68, 72, 80, 82.....	3.85	0.35	9.09	3.21	0.78	24.30	2.55	0.66	3.9	1.20
69, 71, 81.....	3.90	0.34	8.72	3.17	0.76	23.97	2.58	0.59	4.4	1.23
70.....	3.95	0.41	10.38	3.06	0.76	24.67	2.51	0.57	4.4	1.23
71, 78.....	4.00	0.25	6.25	3.28	0.88	25.30	2.63	0.66	4.0	1.22
72.....	4.10	0.37	9.02	3.20	0.76	23.75	2.55	0.65	3.9	1.23
73.....	4.15	0.28	6.75	3.26	0.78	23.92	2.57	0.69	3.7	1.27
74.....	4.25	0.30	7.06	3.25	0.77	23.69	2.50	0.75	3.8	1.31
75.....	4.30	0.31	7.21	3.32	0.77	23.19	2.57	0.75	3.4	1.30
76.....	4.40	0.41	9.32	3.40	0.77	22.65	2.56	0.82	3.1	1.29
Average of factory experiments.....	3.81	0.35	9.19	3.12	0.74	23.72	2.53	0.59	4.3	1.22
Average of station experiments.....	4.08	0.32	7.84	3.26	0.79	24.23	2.56	0.70	3.7	1.25
Average of all September experiments.....	3.94	0.33	8.86	3.19	0.77	24.14	2.54	0.65	3.9	1.23

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of green cheese.	Pounds of caseine and albumen in 100 lbs. of green cheese.	Pounds of water in 100 lbs. of green cheese.	Pounds of fat in 100 lbs. of water free cheese	Pounds of caseine and albumen in 100 lbs. of water-free cheese.	Pounds of green cheese made from 100 lbs. of milk.	Pounds of water in cheese from 100 lbs. of milk	Pounds of fat in cheese from 100 lbs. of milk	Pounds of caseine and albumen in cheese from 100 lbs. of milk.	Pounds of cheese made for 1 lb. of fat in milk	Pounds of milk required to make one lb. of cheese.
64.	31.52	34.55	37.00	55.5	37.5	9.65	3.57	3.88	2.87	2.62	10.25
65.	35.30	34.00	35.54	55.5	37.1	9.70	3.45	3.51	2.49	2.62	10.30
66.	36.05	34.07	35.11	55.5	37.1	9.87	3.47	3.56	2.88	2.58	10.13
67, 70.	35.77	34.13	35.30	55.1	37.6	9.51	3.51	3.51	2.57	2.58	10.19
68, 73, 80, 88.	34.30	33.77	37.54	54.9	39.1	10.41	3.91	3.58	2.47	2.57	9.65
69.	34.78	33.58	37.30	55.4	37.5	10.34	3.85	3.69	2.43	2.55	9.65
70, 71, 81.	35.12	34.30	36.82	56.7	38.1	9.96	3.61	3.59	2.48	2.53	10.05
72.	34.30	32.35	36.54	55.6	35.2	11.03	4.25	3.78	2.45	2.76	9.03
77, 78.	34.00	32.90	37.54	55.4	35.7	10.84	4.07	3.75	2.48	2.64	9.37
79.	36.06	33.34	36.23	56.5	36.6	10.84	3.93	3.97	2.59	2.61	9.37
80.	36.00	33.57	36.26	56.5	36.2	11.04	4.01	3.91	2.55	2.60	9.05
81.	37.84	33.96	34.70	57.0	36.7	11.04	3.99	3.86	2.56	2.60	9.40
82.	38.57	32.34	40.60	56.3	37.6	11.96	4.66	3.99	2.87	2.73	8.85
83.	35.68	34.36	36.29	55.9	36.1	9.91	3.60	3.53	2.40	2.60	10.00
Average of 64-83.	34.57	32.93	37.73	55.5	36.9	10.56	4.15	3.79	2.51	2.60	9.19
Average of 1.	35.13	33.05	37.00	55.5	37.5	10.41	3.96	3.65	2.46	2.64	9.19

SUMMARY OF RESULTS.

I. Loss of Milk-Constituents in Cheese-making.

1. *Fat.*

a. The actual amount of fat lost in the whey for 100 pounds of milk was fairly uniform under the same conditions of manufacture and was practically independent of the amount of fat in the milk.

b. The average amount of fat lost in the whey, in all the experiments, was 0.33 pounds (a little over five ounces) for 100 pounds of milk, which was about 8.40 per cent of the fat in the milk. In the factory experiments the average loss was about 9.20 per cent of the fat in the milk; in the station experiments, it was about 7.80 per cent of the fat in the milk.

2. *Caseine and albumen.*

a. The amount of caseine and albumen lost in the whey was quite uniform under all the conditions tried.

b. The average amount of caseine and albumen lost in the whey, in all the June experiments, was about 0.77 pounds (about twelve and one-half ounces) for 100 pounds of milk, which was about twenty-four per cent of the caseine and albumen in the milk.

c. Taking all the milks, the caseine averaged 2.54 pounds, and the albumen 0.65 pounds in 100 pounds of milk; for every pound of albumen there were 3.9 pounds of caseine.

II. Influence of Composition of Milk on Composition of Cheese.

1. *Fat.*

a. The amount of fat in 100 pounds of green cheese varied from 33.37 to 37.24 pounds, and averaged about 35.1 pounds.

2. *Caseine and albumen.*

a. In the cheese made from the normal milks the amount of caseine and albumen in 100 pounds of cheese was a fairly uniform quantity, varying in the green cheese from 22.25 to 24.90 pounds, and, in the water-free cheese, varying from thirty-six to thirty-nine pounds.

3. *Relation of fat to caseine and albumen in cheese as a basis for determining the character of milk.*

a. The results appear to indicate that in cheese, made from normal milk containing from 3.5 to 4.4 pounds of fat in 100 pounds

of milk, there should be about 1.4 to 1.5 pounds of fat for one pound of caseine and albumen in the water-free cheese.

III. Influence of Composition of Milk on Yield of Cheese.

1. *Fat.*

a. Of the increased yield of cheese obtained in the various experiments, over four-tenths of the increase, on an average, were due to an increase of fat in the milk from which the cheese was made.

2. *Caseine and albumen.*

a. On an average, the increase of caseine and albumen in the milk produced about one-tenth of the increased yield of cheese observed in the various experiments.

b. The amount of caseine and albumen retained in the cheese made from 100 pounds of milk increased quite uniformly when the amount of caseine and albumen in the milk increased.

3. *Water.*

a. Nearly one-half of the increased yield of cheese was due to an increased amount of water retained in the cheese.

b. The amount of water retained in the cheese made from 100 pounds of milk was quite variable, and appeared to be dependent upon conditions of manufacture more than upon the composition of the milk.

IV. Yield of Cheese.

1. *Pounds of cheese made from milk.*

a. Of the factory milk there were required, on an average, 10.1 pounds to make one pound of cheese.

b. Of the station milk, 9.1 pounds sufficed to make one pound of cheese.

c. One hundred pounds of factory milk made, on an average, 9.9 pounds of green cheese; 100 pounds of station milk made 10.06 pounds of green cheese.

V. Influence of Variation of Conditions of Manufacture.

1. *Variation in amount of rennet used.*

The comparison gave results that were not uniform in respect to loss of constituents or yield of cheese.

2. *Cutting curd in hard and soft condition.*

a. Loss of milk-constituents.—Hard cutting gave slightly less loss of fat.

b. Yield.—The results regarding yield were not essentially different.

3. *Comparison of stirred-curd and Cheddar processes.*

a. Loss of milk-constituents.—The loss was practically the same in both processes.

b. Yield.—In one case the Cheddar process gave a greater yield, and, in the other, a smaller yield than the stirred-curd process.

4. *Retaining natural gases in milk.*

a. Loss of milk-constituents.—The loss of fat, caseine, etc., was not larger than in case of milk treated in the usual way.

b. Yield.—The yield was normal in quantity.

c. Quality.—In one case the flavor was not quite perfect; in the second trial, the flavor was perfect.

5. *Storing milk in unclean vessels.*

a. Loss of milk-constituents.—The amount of fat lost was considerably above the average loss observed with well-kept milk.

b. Yield.—The yield was good in quantity, owing to excess of moisture retained.

c. Quality.—The cheese was poor in quality.

6. *Aeration of milk by separation.*

a. Loss of milk-constituents.—The loss of fat in manufacture was a little greater than in the unseparated milk, while there was, in addition, considerable loss from inability to mix fat completely with skim-milk.

b. Yield.—The yield was somewhat less from the separated milk.

c. Quality.—The cheese was perfect in every respect.

VI. Loss of Cheese in Weight During First Month.

The loss of weight varied, for the first month, from 4.60 to 6.64 pounds for each 100 pounds of green cheese, excepting the cheese made from partially soured milk, which lost 15.7 pounds.

CHEESE INVESTIGATION AND EXPERIMENTS FOR
OCTOBER.

The factory experiments in October, did not differ in detail from those of the preceding months. The station experiments, in con-

tinuation of those begun in September, were devoted to a study of the influence of tainted, aerated and unaerated milk upon the manufacture of cheese; and, in addition, the study of the effect of skimming milk and adding cream was continued from previous months.

In experiment 91 a portion of the milk was placed warm in closed cans and cooled at once to about fifty degrees Fahrenheit.

In experiments 93 and 94 a portion of the milk had been exposed over night to foul odors arising from excrements; in 93 the milk was made into cheese without any aeration, while in 94 the milk was aerated by passing through a Baby Separator No. 2.

In experiments 95 and 96 the milk was somewhat tainted, and acid also; in 95 the milk was not aerated in any way, while in 96 it was passed through a Baby Separator.

In experiment 97 the fresh milk was aerated and cooled to about seventy degrees Fahrenheit, by allowing milk to flow in a thin layer over a large tin cylinder filled with cold water; in 98 the milk was not aerated further than by simple exposure to air.

In 103 a portion of the milk was exposed over night in a closed room, in which the air was strong with odor of tobacco smoke.

In 100 one-tenth of the milk (twenty-five pounds) was passed through a separator and the skim-milk put back with the remaining 225 pounds of whole-milk. In 99 250 pounds of the same milk, unskimmed, were used.

In 102 there were used 125 pounds of whole-milk and the skim-milk obtained by passing another 125 pounds of the same milk through a separator. In 101 there were used 250 pounds of the same whole-milk as that used for 102, and, in addition, the cream taken from 125 pounds of whole-milk, the skim-milk from which was used in 102.

In experiment 92 the milk was diluted with about ten per cent of water in order to see what effect, if any, dilution would have upon the loss and yield. It is well known that many, if not most, dairymen allow their cans of milk to stand uncovered in the open air over night, and, in case of rain, more or less water gets into the milk.

ANALYSES OF MILK, WHEY AND CHEESE.

OCTOBER, 1892.	COMPOSITION EXPRESSED IN PARTS PER HUNDRED.								FROM ONE HUNDRED POUNDS OF MILK.							
	Per cent of water.	Per cent of total solids.	Per cent of fat.	Per cent of caseine and albumen.	Per cent of caseine.	Per cent of albumen.	Per cent of sugar, ash, etc.		Pounds.	Pounds of water.	Pounds of total solids.	Pounds of fat.	Pounds of caseine and albumen.	Pounds of caseine.	Pounds of albumen.	Pounds of sugar, ash, etc.
No. 83—October 4:																
Milk	86.81	13.19	4.05	3.53	2.72	0.86	5.56	Milk	86.81	13.19	4.05	3.53	2.72	0.86	5.56	
Whey	93.38	6.62	0.33	0.98	.....	.....	5.31	Whey	82.73	5.87	0.29	0.87	.....	.....	4.71	
Green cheese	37.00	63.00	32.25	24.12	22.45	1.67	5.63	Cheese	4.22	7.18	3.79	2.75	2.56	0.19	0.64	
No. 84—October 4:																
Milk	86.58	13.42	4.75	3.56	2.81	0.75	5.71	Milk	86.58	13.42	4.15	3.56	2.81	0.75	5.71	
Whey	93.12	6.88	0.41	0.99	.....	.....	5.48	Whey	81.96	6.06	0.86	0.87	.....	.....	4.82	
Green cheese	38.80	61.20	32.25	23.25	21.67	1.58	5.70	Cheese	4.66	7.84	3.87	2.79	2.60	0.19	0.68	
No. 85—October 5:																
Milk	86.56	13.44	4.00	3.58	2.80	0.78	5.86	Milk	86.56	13.44	4.03	3.58	2.80	0.78	5.86	
Whey	93.16	6.84	0.37	0.99	.....	.....	5.58	Whey	82.22	6.04	0.83	0.79	.....	.....	4.92	
Green cheese	38.00	62.00	32.11	24.10	23.27	0.83	5.79	Cheese	4.46	7.28	3.77	2.83	2.73	0.10	0.68	
No. 86—October 5:																
Milk	86.33	13.67	4.15	3.70	2.87	0.83	5.82	Milk	86.33	13.67	4.15	3.70	2.87	0.83	5.82	
Whey	93.17	6.83	0.35	0.97	.....	.....	5.51	Whey	81.73	5.99	0.81	0.85	.....	.....	4.88	
Green cheese	36.76	61.24	31.90	23.61	22.89	0.72	5.73	Cheese	4.76	7.52	3.91	2.90	2.81	0.09	0.71	
No. 87—October 6:																
Milk	86.31	13.69	4.10	3.69	2.90	0.79	5.90	Milk	86.31	13.69	4.10	3.69	2.90	0.79	5.90	
Whey	93.12	6.86	0.30	1.03	.....	.....	5.55	Whey	82.18	6.07	0.26	0.91	.....	.....	4.90	
Green cheese	37.18	62.82	33.14	24.14	22.40	1.74	5.54	Cheese	4.37	7.38	3.89	2.83	2.63	0.20	0.66	
No. 88—October 6:																
Milk	86.09	13.91	4.25	3.70	2.99	0.71	5.96	Milk	86.09	13.91	4.25	3.70	2.99	0.71	5.96	
Whey	93.13	6.87	0.30	1.02	.....	.....	5.55	Whey	82.18	6.08	0.26	0.90	.....	.....	4.90	
Green cheese	36.21	63.79	34.60	24.03	22.81	1.87	5.11	Cheese	4.26	7.50	4.07	2.83	2.68	0.15	0.60	
No. 89—October 7:																
Milk	86.52	13.48	4.10	3.70	2.98	0.73	5.68	Milk	86.52	13.48	4.10	3.70	2.98	0.72	5.68	
Whey	93.13	6.87	0.40	1.03	.....	.....	5.44	Whey	82.26	6.07	0.35	0.91	.....	.....	4.81	
Green cheese	37.64	62.86	33.00	23.95	22.62	1.33	5.41	Cheese	4.39	7.28	3.85	2.79	2.64	0.15	0.64	

No. 90—October 7:	Milk	86.13	13.87	4.35	3.76	3.00	0.76	5.76	100	86.13	13.87	4.35	3.76	3.00	0.76	5.76
	Whey	93.07	6.93	0.36	1.07	.....	.....	5.50	87.90	81.81	6.09	0.32	0.94	.....	.....	4.88
	Green cheese	37.88	62.62	34.00	23.57	21.80	1.77	5.05	12.10	4.52	7.53	4.11	2.85	2.64	0.21	0.63
No. 91—October 18:	Milk	87.14	12.86	4.00	3.26	2.63	0.58	5.60	100	87.14	12.86	4.00	3.26	2.63	0.58	5.60
	Whey	93.23	6.77	0.32	0.79	.....	.....	5.66	89.04	83.01	6.03	0.28	0.70	.....	.....	5.05
	Green cheese	36.23	63.77	34.63	23.61	23.03	0.55	5.50	10.96	3.97	6.99	3.79	2.59	2.53	0.06	0.61
No. 92*—October 18:	Milk	88.31	11.69	3.70	2.99	2.43	0.57	5.00	100	88.31	11.69	3.70	2.99	2.42	0.57	5.00
	Whey	93.88	6.12	0.33	0.74	.....	.....	5.05	89.80	84.30	5.50	0.30	0.66	.....	.....	4.54
	Green cheese	37.63	62.37	33.82	23.62	23.78	0.84	4.93	10.20	3.84	6.36	3.45	2.41	2.32	0.09	0.50
No. 93—October 19:	Milk	87.40	12.60	3.90	3.25	2.64	0.61	5.45	100	87.40	12.60	3.90	3.25	2.64	0.61	5.45
	Whey	93.57	6.63	0.30	0.78	.....	.....	5.55	89.20	83.29	5.91	0.27	0.70	.....	.....	4.94
	Green cheese	37.31	62.69	34.17	24.17	23.48	0.69	4.35	10.80	4.03	6.77	3.69	2.61	2.53	0.08	0.47
No. 94—October 19:	Milk	87.40	12.60	3.90	3.25	2.64	0.61	5.45	100	87.40	12.60	3.90	3.25	2.64	0.61	5.45
	Whey	93.37	6.63	0.36	0.77	.....	.....	5.50	89.40	83.47	5.93	0.32	0.69	.....	.....	4.92
	Green cheese	38.53	61.47	33.60	23.64	23.11	0.53	4.23	10.60	4.08	6.52	3.56	2.50	2.45	0.05	0.46
No. 95—October 20:	Milk	86.93	13.07	4.05	3.31	2.71	0.60	5.71	100	86.93	13.07	4.05	3.31	2.71	0.60	5.71
	Whey	93.09	6.91	0.40	0.81	.....	.....	5.70	88.76	82.63	6.13	0.36	0.72	.....	.....	5.05
	Green cheese	38.80	61.20	33.34	23.40	22.38	1.02	4.46	11.24	4.36	6.88	3.75	2.63	2.59	0.11	0.50
No. 96—October 20:	Milk	87.09	12.91	4.10	3.35	2.71	0.64	5.46	100	87.09	12.91	4.10	3.35	2.71	0.64	5.46
	Whey	93.12	6.83	0.40	0.82	.....	.....	5.66	89.04	82.91	6.13	0.36	0.73	.....	.....	5.04
	Green cheese	37.43	62.57	34.17	23.98	22.88	1.10	4.42	10.96	4.10	6.86	3.75	2.63	2.51	0.12	0.48
No. 97—October 21:	Milk	86.50	13.50	4.35	3.42	2.79	0.63	5.73	100	86.50	13.50	4.35	3.42	2.79	0.63	5.73
	Whey	92.92	7.08	0.34	0.82	.....	.....	5.92	88.70	82.42	6.28	0.30	0.73	.....	.....	5.25
	Green cheese	34.82	65.68	36.87	24.76	22.91	1.85	4.55	11.30	3.88	7.43	4.11	2.79	2.59	0.20	0.52
No. 98—October 21:	Milk	86.67	13.33	4.10	3.42	2.75	0.67	5.81	100	86.67	13.33	4.10	3.42	2.75	0.67	5.81
	Whey	93.00	7.00	0.44	0.80	.....	.....	5.76	88.76	82.55	6.21	0.39	0.71	.....	.....	5.11
	Green cheese	37.00	63.00	33.85	24.62	22.16	2.46	4.53	11.24	4.16	7.08	3.80	2.77	2.49	0.28	0.51
No. 99—October 25:	Milk	86.58	13.42	4.15	3.46	2.85	0.61	5.81	100	86.58	13.42	4.15	3.46	2.85	0.61	5.81
	Whey	92.95	7.05	0.31	0.84	.....	.....	5.50	88.17	81.95	6.22	0.27	0.74	.....	.....	5.21
	Green cheese	38.12	61.83	33.95	23.99	23.53	0.41	3.94	11.53	4.51	7.32	4.01	2.84	2.79	0.05	0.47

* Milk diluted with about ten per cent of water.

ANALYSES OF MILK, WHEY AND CHEESE — (Concluded).

	COMPOSITION EXPRESSED IN PARTS PER HUNDRED.						FROM ONE HUNDRED POUNDS OF MILK.					
	Per cent of water.	Per cent of total solids.	Per cent of fat.	Per cent of caseine and albumen.	Per cent of caseine.	Per cent of albumen.	Pounds of water.	Pounds of total solids.	Pounds of fat.	Pounds of caseine and albumen.	Pounds of caseine.	Pounds of albumen.
OCTOBER, 1892.	No. 100—October 25:											
	Milk*.....	86.92	13.08	3.80	3.48	2.81	0.67	5.80	3.80	3.48	2.81	0.67
	Whey.....	92.98	7.02	0.30	0.84	.....	88.58	6.21	0.27	0.74	.....	.....
	Green cheese.....	39.92	60.08	31.50	24.76	28.92	11.47	6.89	3.61	2.84	2.74	0.10
	No. 101—October 26:											
	Milk+.....	85.35	14.65	5.70	3.32	2.80	0.52	5.63	5.70	3.32	2.80	0.52
	Whey.....	92.95	7.05	0.49	0.79	.....	85.84	6.06	0.42	0.68	.....	.....
	Green cheese.....	39.15	61.85	38.13	19.53	18.89	14.16	8.76	5.40	2.77	2.68	0.09
	No. 102—October 26:											
	Milk*.....	88.17	11.83	2.40	3.47	2.90	0.57	5.96	2.40	3.47	2.90	0.57
	Whey.....	93.12	6.88	0.18	0.80	.....	90.00	6.19	0.16	0.72	.....	.....
	Green cheese.....	43.71	57.29	23.13	28.10	26.94	10.00	5.73	2.31	2.81	2.69	0.13
	No. 103—October 27:											
	Milk.....	86.54	13.46	4.40	3.47	2.84	0.63	5.59	4.40	3.47	2.84	0.63
	Whey.....	92.67	7.03	0.33	0.83	.....	88.80	6.21	0.29	0.73	.....	.....
	Green cheese.....	37.58	62.42	35.44	23.60	22.58	11.70	7.90	4.15	2.76	2.64	0.11
	No. 104—October 27:											
	Milk.....	86.86	13.14	4.00	3.56	2.96	0.60	5.58	4.00	3.56	2.96	0.60
	Whey.....	92.98	7.02	0.24	0.85	.....	87.57	6.15	0.21	0.74	.....	.....
	Green cheese.....	42.90	57.10	30.84	23.91	21.39	12.44	7.10	3.84	2.81	2.61	0.20
	No. 105—October 28:											
	Milk.....	86.95	13.05	4.05	3.45	2.83	0.62	5.55	4.05	3.45	2.83	1.62
	Whey.....	93.10	6.90	0.36	0.84	.....	88.80	6.10	0.32	0.74	.....	.....
	Green cheese.....	39.60	60.40	32.12	23.81	23.00	11.80	7.13	3.79	2.81	2.71	0.10
	No. 106—October 28:											
	Milk.....	86.95	13.05	4.05	3.45	2.83	0.62	5.55	4.05	3.45	2.83	0.62
	Whey.....	93.13	6.87	0.37	0.84	.....	88.86	6.07	0.33	0.74	.....	.....
	Green cheese.....	39.56	60.44	32.20	24.31	23.55	11.64	7.04	3.76	2.83	2.74	0.09

* Milk partially skimmed. + Cream added.

TABULATED STATEMENT OF THE PRINCIPAL CONDITIONS OF MANUFACTURE.

NUMBER OF EXPERIMENT.	Date.	Kind of cheese made	Pounds of milk used	Pounds of green cheese made.	Temperature of milk when rennet was added.	Ounces of rennet extract used per 1,000 lbs. of milk.	Time required for milk to begin to thicken.	Time from adding rennet to cutting curd.	Condition of curd when cut	Temperature to which curd was heated after cutting, etc.	Time taken to heat to 88 degrees F. or more.	Time from reaching required temperature to drawing whey.	Time from drawing whey to salting.	Ounces of salt used for each pound of fat in milk.	Time from salting to putting in press.	Time of whole operation.
	1892				Fahr. degrees		Mins.	Mins.		Fahr. degrees	Min.	Min.	Min.		Min.	Hrs. Min.
83	Oct. 4	Cheddar	3,749	427.50	90	3	17	23	Soft	100	45	105	160	1.18	20	7 27
84	Oct. 4	Cheddar	2,903	348.25	90	3	15	21	Hard	100	50	70	135	1.16	15	7 17
85	Oct. 5	Cheddar	3,464	408.75	88	3	15	21	Ordinary	100	50	72	138	1.32	20	8 10
86	Oct. 5	Cheddar	2,951	362.25	86	3	14	24	Ordinary	100	62	68	115	1.16	20	7 55
87	Oct. 6	Stirred-curd	3,144	369.50	86	3	20	26	Ordinary	100	77	182	25	1.17	30	7 35
88	Oct. 6	Cheddar	3,144	39.75	86	3	16	25	Ordinary	100	87	135	145	1.13	15	8 40
89	Oct. 7	Cheddar	3,281	393.06	86	3	18	25	Ordinary	100	80	110	180	1.17	50	9 20
90	Oct. 7	Cheddar	3,281	397.00	86	6	10	14	Ordinary	100	79	125	145	1.10	45	8 45
91	Oct. 18	Cheddar	250	27.40	84	3	13	19	Ordinary	99	40	55	175	1.20	10	6 20
92	Oct. 18	Cheddar	250	25.50	86	3	14	20	Ordinary	99	42	68	155	1.08	15	6 15
93	Oct. 19	Cheddar	250	27.00	85	3	17	23	Ordinary	100	35	60	150	1.03	15	5 43
94	Oct. 19	Cheddar	250	28.50	85	3	17	24	Ordinary	100	35	65	150	1.03	15	5 47
95	Oct. 20	Cheddar	250	28.10	88	3	7	9	Ordinary	100	25	7	61	1.00	17	5 05
96	Oct. 20	Cheddar	250	27.40	88	3	7	11	Ordinary	100	28	7	53	0.98	17	5 05
97	Oct. 21	Cheddar	250	28.25	85	3	19	26	Ordinary	100	52	65	100	0.92	15	5 33
98	Oct. 21	Cheddar	250	28.10	85	3	19	26	Ordinary	100	52	75	120	0.98	15	5 33
99	Oct. 25	Cheddar	250	29.60	85	3	16	30	Ordinary	99	45	70	153	0.95	20	7 10
100	Oct. 25	Cheddar	245	28.10	85	3	16	29	Ordinary	99	45	60	170	1.05	20	7 15
101	Oct. 26	Cheddar	271	38.40	85	4	14	28	Ordinary	99	42	68	120	1.04	20	7 35
102	Oct. 26	Cheddar	239	22.90	85	3	14	25	Ordinary	97	35	60	125	1.33	20	6 25
103	Oct. 27	Cheddar	250	29.25	85	3	16	30	Ordinary	99	66	70	115	0.91	20	6 15
104	Oct. 27	Cheddar	250	31.10	85	3	13	22	Ordinary	99	75	55	180	1.00	25	6 05
105	Oct. 28	Cheddar	250	29.30	85	3	16	25	Ordinary	99	47	80	155	0.98	18	6 05
106	Oct. 28	Cheddar	250	29.10	85	9	6	13	Ordinary	99	47	73	164	0.98	21	6 10

Statement of Results.

1. Time required for milk to begin to thicken after addition of rennet.

a. Factory experiments.—The time varied from ten to twenty minutes, and averaged about sixteen minutes.

b. Station experiments.—The time varied from six to nineteen minutes, and averaged about fourteen minutes.

2. Time from adding rennet to cutting curd.

a. Factory experiments.—The time varied from fourteen to twenty-eight minutes, and averaged about twenty-three minutes.

b. Station experiments.—The time varied from nine to thirty minutes, and averaged about fifteen minutes.

3. Time required to heat to 98 degrees F. or more after cutting and stirring curd.

a. Factory experiments.—The time varied from forty-five to eighty-seven minutes, and averaged about sixty-four minutes.

b. Station experiments.—The time varied from twenty-five to seventy-five minutes, and averaged about forty-four minutes.

4. Time from reaching 98 degrees F. or more to drawing whey.

a. Factory experiments.—The time varied from sixty-eight to 182 minutes, and averaged 108 minutes.

b. Station experiments.—The time varied from seven to eighty minutes, and averaged sixty-nine minutes.

5. Time from drawing whey to salting curd.

a. Factory experiments.—The time varied from 115 to 180 minutes in the Cheddar process, averaging 145 minutes; in the stirred-curd process the time was twenty-five minutes.

b. Station experiments.—The time varied from fifty-eight to 175 minutes, and averaged 131 minutes in the Cheddar process.

6. Time occupied by the whole operation of cheese-making.

a. Factory experiments.—The time varied from seven hours and seventeen minutes to over nine hours, and averaged about eight hours and ten minutes.

b. Station experiments.—The time varied from five hours and five minutes to seven hours and thirty-five minutes, and averaged about six hours.

For explanation of data in the various tables following, see "Cheese Investigation and Experiments for May," in this report.

LOSS OF MILK-CONSTITUENTS IN CHEESE-MAKING.

Amount of Fat Recovered and Lost in Cheese-making.

TABLE SHOWING AMOUNT OF FAT RECOVERED AND LOST IN CHEESE-MAKING.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of fat lost in whey for 100 lbs. of milk.	Pounds of fat recovered in cheese for 100 lbs. of milk.	Per cent of fat in milk lost in whey.	Per cent of fat in milk recovered in cheese.
85.....	4.00	0.33	3.67	8.25	91.75
83.....	4.05	0.29	3.76	7.16	92.84
87.....	4.10	0.36	3.84	6.34	93.66
89.....	4.10	0.35	3.75	8.54	91.46
84.....	4.15	0.36	3.79	8.67	91.33
86.....	4.15	0.31	3.84	7.47	92.53
88.....	4.25	0.26	3.99	6.12	93.88
90.....	4.35	0.32	4.03	7.36	92.64
102*.....	2.40	0.16	2.24	6.67	93.33
92.....	3.70	0.30	3.40	8.10	91.90
100*.....	3.80	0.27	3.00	7.10	92.90
93.....	3.90	0.27	3.53	6.92	93.08
94.....	3.90	0.32	3.58	8.20	91.80
91.....	4.00	0.28	3.72	7.00	93.00
104.....	4.00	0.21	3.79	5.25	94.75
95.....	4.05	0.36	3.69	8.89	91.11
105.....	4.05	0.32	3.73	7.90	92.10
106.....	4.05	0.33	3.72	8.15	91.85
96.....	4.10	0.36	3.74	8.78	91.22
98.....	4.10	0.39	3.71	9.51	90.49
99.....	4.15	0.27	3.88	6.50	93.50
97.....	4.35	0.30	4.05	6.90	93.10
103.....	4.40	0.29	4.11	6.59	93.41
101†.....	5.70	0.42	5.28	7.37	92.63

Statement of Results.

1. Pounds of fat in 100 pounds of milk.

a. Factory experiments.—The milk-fat varied from 4.00 to 4.35 pounds in 100 pounds of milk, and averaged 4.14 pounds.

b. Station experiments.—The milk fat varied from 2.40 to 5.70 pounds of fat in 100 pounds of milk, and averaged 4.04 pounds; or, if we exclude the abnormal milks, the variation of fat

* Milk partially skimmed.

† Cream added.

was from 3.70 to 4.40 pounds in the station milks that were normal, the average of fat being unchanged.

2. Pounds of fat lost for 100 pounds of milk.

a. Factory experiments.—The amount of fat lost in the whey varied from 0.26 to 0.35 pounds for each 100 pounds of milk, and averaged 0.31 pounds.

b. Station experiments.—The loss of fat varied from 0.16 to 0.39 pounds for each 100 pounds of milk, and averaged 0.30 pounds.

3. Per cent of fat in milk lost in whey.

a. Factory experiments.—The per cent of milk-fat that was lost varied from 6.12 to 8.67 per cent, and averaged 7.50 per cent of the fat in the milk.

b. Station experiments.—The per cent of milk-fat lost varied from 5.25 to 9.51 per cent, and averaged 7.42 per cent of the fat in the milk.

4. Comparison of stirred-curd and Cheddar processes with reference to loss of fat.

a. Factory experiments.—In experiment 88 the Cheddar process was employed, and in experiment 87, made the same day, the stirred-curd process was used. The loss of fat was practically the same in both cases.

5. Influence of cutting curd in hard and soft condition upon loss of fat.

a. Factory experiments.—In experiment 84 the curd was cut hard; in experiment 83 it was cut soft. The proportion of fat lost was greater in case of the hard cutting, being as 8.67 to 7.16 per cent of the fat in the milk.

6. Influence of using different amounts of rennet upon loss of fat.

a. Factory experiments.—In experiment 90 six ounces of rennet-extract were used, twice as much as in the other factory experiments. The loss of fat was less than the average of the other factory experiments.

b. Station experiments.—In experiment 105 three ounces of rennet were used; in 106 nine ounces. The loss of fat was slightly greater when the larger amount of rennet was used.

7. Influence of retaining gases in milk upon loss of fat in cheese-making.

In experiment 91 125 pounds of evening milk were put in a covered can and cooled down to about 50 degrees F., so that none of the gases which produce the characteristic "animal odor" of freshly-drawn milk were allowed to escape. The next morning, this milk was mixed with 125 pounds of other milk which had been kept in open vessels. The loss was a little below the average of the experiments made during the month. No sign of "animal odor" or other taint was discernible at any stage of the process.

8. Influence of exposing milk to foul odors upon loss of fat in cheese-making.

In experiments 93 and 94 133 pounds of evening milk were exposed in open vessels over night to foul odors. This was mixed with 367 pounds of well-stored milk. In 93 250 pounds of this milk were placed in one vat and made into cheese; in 94 250 pounds of the milk were aerated by a separator and then made into cheese. The loss of fat in 93 was 6.92 per cent of the fat in the milk, being under the average loss. Some odor was perceptible during the process of manufacture, but nothing very pronounced. The low temperature of the weather probably prevented development of characteristic taint. We shall repeat the work another season, when the weather is more favorable to the production of tainted milk. Aeration of the same milk in 94 resulted in a somewhat greater loss of fat.

In experiment 103 the exposure of milk to the atmosphere filled with tobacco smoke did not cause an appreciable loss of fat, but the odor of the tobacco smoke was discernible, though not very strong, during the process of manufacture.

9. Influence of aerating milk upon loss of fat in cheese-making.

In experiments 94 and 96 250 pounds of milk were passed through a Baby Separator No. 2 and the cream and skim-milk were then mixed together and made into cheese. In experiments 93 and 95 250 pounds of the same milks as those used in 94 and 96 before separating were made into cheese under the same conditions. The loss was a trifle greater in 94 than in the unsepa-

rated milk used in experiment 93, while in 96 the loss was about the same as in 95.

In experiment 97 the milk was aerated as previously described; in 98 the milk was not aerated at all. The loss of fat was noticeably greater in the case of the unaerated milk, being as 9.51 for the unaerated milk to 6.90 per cent for the aerated milk.

10. Influence of diluting milk with water upon loss of fat in cheese-making.

In experiment 92 the milk was diluted with about ten per cent of water. The loss of fat was somewhat above the average loss, being 8.10 per cent of the fat in the milk.

11. Influence of skimming and adding cream upon loss of fat. In experiment 100 nearly one-tenth of the fat was removed from 250 pounds of milk and made into cheese beside 250 pounds of whole-milk; the fat was reduced by skimming from 4.15 to 3.80 pounds in 100 pounds of milk. The per cent of milk-fat lost in the whole-milk was 6.50, while in case of the skimmed milk the loss was 7.10 per cent of the milk-fat.

In experiment 102 there were used 125 pounds of whole-milk and the skimmed milk obtained by separating another 125 pounds of the same whole-milk, making 125 pounds of whole-milk and 104 pounds of skim-milk, or 229 pounds of milk which contained 2.40 pounds of fat in 100 pounds of milk. This amounted to a removal of about forty per cent of the fat in the whole milk. In 101 the twenty-one pounds cream taken from 125 pounds of milk in 102 were added to 250 pounds of whole-milk, making 271 pounds of milk containing 5.70 pounds of fat in 100 pounds of milk. The per cent of milk-fat lost in making the skim-milk into cheese was 6.67, while in the case of the milk enriched by cream, the loss was 7.37 per cent of the fat in the milk.

12. General summary.

Taking all the milk used in the twenty-four October experiments, the average amount of fat in 100 pounds of milk was 4.08 pounds; of this fat about 0.31 pounds (about five ounces), or 7.60 per cent of the fat in the milk, were lost in the whey for each 100 pounds of milk, while 3.77 pounds of fat were recovered

in the cheese. The difference in the loss of fat between the highest and lowest amounts was about four ounces of fat for each hundred pounds of milk.

Amount of Caseine and Albumen Recovered and Lost in Cheese-making.

TABLE SHOWING AMOUNT OF CASEINE AND ALBUMEN RECOVERED AND LOST IN CHEESE-MAKING.

NUMBER OF EXPERIMENT.	Pounds of caseine and albumen in 100 lbs. of milk.	Pounds of caseine and albumen lost in whey for 100 lbs. of milk.	Pounds of caseine and albumen recovered in cheese for 100 lbs. of milk.	Per cent of caseine and albumen in milk lost in whey.	Per cent of caseine and albumen in milk recovered in cheese.
85.....	3.58	0.79	2.79	22.07	77.93
83.....	3.58	0.87	2.71	24.30	75.70
87.....	3.69	0.91	2.78	24.66	75.34
89.....	3.70	0.91	2.79	24.60	75.40
84.....	3.56	0.87	2.69	24.44	75.56
86.....	3.70	0.85	2.85	22.97	77.03
88.....	3.70	0.90	2.80	24.32	75.68
90.....	3.76	0.94	2.82	25.00	75.00
102.....	3.47	0.72	2.75	20.75	79.25
92*.....	3.99	0.66	2.33	22.07	77.93
100.....	3.48	0.74	2.74	21.26	78.74
93.....	3.25	0.70	2.55	21.54	78.46
94.....	3.25	0.69	2.56	21.23	78.77
91.....	3.26	0.70	2.56	21.47	78.53
104.....	3.56	0.74	2.82	20.79	79.21
95.....	3.31	0.72	2.59	21.75	78.25
105.....	3.45	0.74	2.71	21.45	78.55
106.....	3.45	0.74	2.71	21.45	78.55
96.....	3.35	0.73	2.62	21.79	78.21
98.....	3.42	0.71	2.71	20.76	79.24
99.....	3.46	0.74	2.72	21.39	78.61
97.....	3.42	0.73	2.69	21.35	78.65
103.....	3.47	0.73	2.74	21.04	78.96
101.....	3.32	0.68	2.64	20.48	79.52

Statement of Results.

1. Pounds of caseine and albumen in 100 pounds of milk.

a. Factory experiments.—The amount of caseine and albumen in the milk varied from 3.56 to 3.76 pounds in 100 pounds of milk, and averaged 3.66 pounds.

* Milk diluted with water.

b. Station experiments.—The amount of caseine and albumen in the normal milk varied from 3.25 to 3.47 pounds in 100 pounds of milk, and averaged 3.47 pounds.

2. Pounds of caseine and albumen lost for 100 pounds of milk.

a. Factory experiments.—The amount of caseine and albumen lost in the whey varied from 0.79 to 0.94 pounds* for each 100 pounds of milk, and averaged 0.88 pounds.

b. Station experiments.—The amount of caseine and albumen lost in the whey varied from 0.66 to 0.74 pounds, and averaged 0.72 pounds for 100 pounds of milk.

3. Per cent of caseine and albumen in milk lost in whey.

a. Factory experiments.—The per cent of caseine and albumen that was lost varied from 22.07 to 25.00 per cent of the caseine and albumen in the milk, and averaged 24.00 per cent.

b. Station experiments.—The per cent of caseine and albumen lost varied from 20.48 to 22.07 per cent of the caseine and albumen in the milk, with an average of 21.37 per cent.

4. Variation of conditions of manufacture, such as using Cheddar and stirred-curd processes, varying the amount of rennet, cutting curd soft and hard, skimming milk, etc., appeared to influence very little, if at all, the amount of caseine and albumen lost in the whey.

5. General summary.

Taking all the October experiments, the amount of caseine and albumen averaged 3.47 pounds in 100 pounds of milk; of this amount, about 0.77 pounds (about 12 ounces), about 22.50 per cent of the caseine and albumen in the milk, were lost in the whey for each 100 pounds of milk, while 2.70 pounds were recovered in the cheese.

Relation of Caseine to Albumen in Milk.

TABLE SHOWING RELATION OF CASEINE TO ALBUMEN IN MILK

NUMBER OF EXPERI- MENT.	Pounds of caseine and albumen in 100 lbs. of milk.	Pounds of caseine in 100 lbs. of milk.	Pounds of albu- men in 100 lbs. of milk.	Pounds of caseine for 100 lbs. of caseine and albu- men together.	Pounds of albu- men for 100 lbs. of caseine and al- bumen together.
85....	3.58	2.80	0.78	78.21	21.79
83....	3.58	2.72	0.86	76.00	24.00
87....	3.69	2.90	0.79	78.60	21.40
89....	3.70	2.98	0.72	80.54	19.46
84....	3.56	2.81	0.75	78.93	21.07
86....	3.70	2.87	0.83	77.57	22.43
88....	3.70	2.99	0.71	80.81	19.19
90....	3.76	3.00	0.76	79.79	20.21
102*...	3.47	2.90	0.57	83.57	16.43
92....	3.99	2.42	0.57	80.93	19.07
100....	3.48	2.81	0.67	80.75	19.25
93....	3.25	2.64	0.61	81.23	18.77
94....	3.25	2.64	0.61	81.23	18.77
91....	3.26	2.68	0.58	82.20	17.80
104....	3.56	2.96	0.60	83.15	16.85
95....	3.31	2.71	0.60	81.87	18.13
105....	3.45	2.83	0.62	82.03	17.97
106....	3.45	2.83	0.62	82.03	17.97
96....	3.35	2.71	0.64	80.90	19.10
98....	3.42	2.75	0.67	80.40	19.60
99....	3.46	2.85	0.61	82.37	17.63
97....	3.42	2.79	0.63	81.58	18.42
103....	3.57	2.84	0.63	81.84	18.16
101†...	3.32	2.80	0.52	84.34	15.66

Statement of Results.

1. Pounds of caseine and albumen in 100 pounds of milk.
a. Factory experiments.—The amount of caseine and albumen averaged 3.66 pounds.

b. Station experiments.—The amount of caseine and albumen averaged 3.37 pounds.

2. Pounds of caseine in 100 pounds of milk.

* Partially skimmed.

† Cream added.

a. Factory experiments.—The caseine varied from 2.72 to 3.00 pounds, and averaged 2.88 pounds in 100 pounds of milk.

b. Station experiments.—The caseine varied from 2.64 to 2.96 pounds, and averaged 2.76 pounds in 100 pounds of milk.

3. Pounds of albumen in 100 pounds of milk.

a. Factory experiments.—The amount of albumen varied from 0.71 to 0.86 pounds, and averaged 0.78 pounds in 100 pounds of milk.

b. Station experiments.—The albumen varied from 0.57 to 0.67 pounds, and averaged about 0.61 pounds in 100 pounds of milk.

4. Pounds of caseine for one pound of albumen in milk.

a. Factory experiments.—For each pound of albumen in the milk the caseine varied from 3.2 pounds to 4.2 pounds, with an average of 3.7 pounds.

b. Station experiments.—For each pound of albumen in the milk the caseine varied from 4.1 pounds to 5.1 pounds, with an average of 4.5 pounds.

5. General summary.

In all the experiments, the average amount of caseine and albumen was 3.47 pounds for 100 pounds of milk; of this amount about 2.80 pounds or 80.7 per cent consisted of caseine, while about 0.67 pounds or 19.3 per cent consisted of albumen. There was on an average, about 4.2 pounds of caseine to one pound of albumen.

INFLUENCE OF COMPOSITION OF MILK ON COMPOSITION OF CHEESE.

Influence of Fat in Milk on Composition of Cheese.

TABLE SHOWING RELATION OF FAT IN MILK TO FAT IN CHEESE.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of fat in 100 lbs. of water-free cheese.	Pounds of fat in 100 lbs. of water- free cheese for one lb. of fat in milk.
85.....	4.00	51.8	13.0
83.....	4.05	52.7	13.0
87.....	4.10	52.8	13.0
89.....	4.10	52.9	13.0
84.....	4.15	52.7	12.7
86.....	4.15	52.1	12.6
88.....	2.25	54.2	12.8
90.....	4.35	54.3	12.5
102*.....	2.40	40.4	17.0
92.....	3.70	54.2	14.6
100*.....	3.80	52.4	13.8
93.....	3.90	54.5	14.0
94.....	3.90	54.7	14.0
91.....	4.00	54.3	13.6
104.....	4.00	54.0	13.5
95.....	4.05	54.5	13.5
105.....	4.05	53.2	13.1
106.....	4.05	53.3	13.2
96.....	4.10	54.6	13.3
98.....	4.10	53.7	13.1
99.....	4.15	54.8	13.2
87.....	4.35	55.4	12.7
103.....	4.40	56.8	12.9
101†.....	5.70	61.7	10.8

Statement of Results.

1. Amount of fat in 100 pounds of milk.

a. Factory experiments.—The fat varied from 4.00 to 4.35 pounds, and averaged 4.14 pounds in 100 pounds of milk.

b. Station experiments.—The fat varied from 2.40 to 5.70 pounds, and averaged 4.04 pounds in 100 pounds of milk.

2. Amount of fat in 100 pounds of water-free cheese.

a. Factory experiments.—The fat varied from 51.8 to 54.3 pounds, and averaged 52.9 pounds for 100 pounds of water-free cheese.

* Milk partially skimmed.

† Cream added.

b. Station experiments.—The fat varied from 40.4 to 61.7 pounds, and averaged 53.9 pounds in 100 pounds of cheese.

3. Pounds of fat in 100 pounds of cheese for one pound of fat in milk.

a. Factory experiments.—The ratio of per cent of fat in milk to per cent of fat in cheese varied from 12.5 to 13 pounds, and averaged 12.8 pounds.

b. Station experiments.—The ratio varied from 10.8 to 17 pounds, and averaged 13.3 pounds.

Influence of Caseine and Albumen in Milk on Composition of Cheese.

TABLE SHOWING RELATION OF CASEINE AND ALBUMEN IN MILK TO CASEINE AND ALBUMEN IN CHEESE.

NUMBER OF EXPERIMENT.	Pounds of caseine and albumen in 100 lbs of milk.	Pounds of caseine and albumen in 100 lbs. of water free cheese.	Ratio of caseine and albumen in milk to caseine and albumen in cheese.	Pounds of fat for one lb. of caseine and albumen in milk.
85	3.58	38.9	10.9	1.11
83	3.58	38.3	10.7	1.13
87	3.69	8.4	10.4	1.11
89	3.70	38.4	10.4	1.11
84	3.56	38.0	10.7	1.17
86	3.70	38.5	10.4	1.12
88	3.70	37.8	10.2	1.15
90	3.76	37.7	10.0	1.16
102*	3.47	49.0	7.1	0.70
92	2.99	38.0	12.7	1.24
100*	3.48	41.2	11.9	1.09
93	3.25	38.5	11.8	1.20
94	3.25	38.5	11.8	1.20
91	3.26	35.5	10.9	1.24
104	3.56	40.0	11.2	1.12
95	3.31	38.2	11.5	1.22
105	3.45	39.4	11.4	1.17
106	3.45	40.2	11.7	1.17
96	3.35	38.3	11.4	1.23
98	3.42	39.1	11.4	1.20
99	3.46	38.8	11.2	1.20
97	3.42	37.7	11.0	1.27
103	3.47	37.8	10.9	1.27
101†	3.32	31.6	9.5	1.71

* Milk partially skimm ed.

† Cream added.

Statement of Results.

1. Pounds of caseine and albumen in 100 pounds of milk.

a. Factory experiments.—The amount of caseine and albumen varied from 3.56 to 3.76 pounds, and averaged 3.66 pounds in 100 pounds of milk.

b. Station experiments.—The amount of caseine and albumen varied from 3.25 to 3.56 pounds, and averaged 3.37 pounds.

2. Pounds of caseine and albumen in 100 pounds of water-free cheese.

a. Factory experiments.—The amount of caseine and albumen varied from 37.8 to 38.9 pounds in 100 pounds of water-free cheese, and averaged 38.3 pounds.

b. Station experiments.—The amount of caseine and albumen in 100 pounds of water-free cheese varied from 31.6 to 49.0 pounds, and averaged 38.9 pounds.

3. Effect of skimming milk and adding cream to milk upon the proportion of caseine and albumen in cheese.

While skimming milk does not cause any marked change in the per cent of caseine and albumen in the milk, it does cause a marked difference in the amount of caseine and albumen relative to the fat, and, therefore, produces a change in the composition of the cheese. In experiments 100 and 102 the milk was partially skimmed, and the amount of caseine and albumen in the cheese was highest in all the experiments; in 101 it was least.

4. Pounds of caseine and albumen in 100 pounds of cheese for one pound of caseine and albumen in milk.

a. Factory experiments.—The ratio varied from 10.0 to 10.9, and averaged 10.5.

b. Station experiments.—The ratio varied from 10.9 to 11.9 for normal milks, or from 7.1 to 12.7 for all, and averaged 11.5.

5. Pounds of fat for one pound of caseine and albumen in milk.

a. Factory experiments.—There were for each pound of caseine and albumen in the milk from 1.11 to 1.17 pounds of fat in the milk, with an average of 1.13 pounds.

b. Station experiments.—The fat varied from 1.12 to 1.27 pounds for each pound of caseine and albumen in the normal milk,

and averaged 1.20. In the milk which was nearly half skimmed the fat amounted to 0.7 pounds for one pound of caseine and albumen.

Relation of Fat to Caseine and Albumen in Cheese as a Basis for Determining the Character of Milk.

TABLE SHOWING RELATION OF FAT TO CASEINE AND ALBUMEN IN CHEESE.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of fat in 100 lbs. of water-free cheese.	Pounds of caseine and albumen in 100 lbs. of water-free cheese.	Pounds of fat for one lb. of caseine and albumen in water-free cheese.
85	4.00	51.8	38.9	1.33
83	4.05	52.7	38.3	1.38
87	4.10	52.8	38.4	1.37
89	4.10	52.9	38.4	1.38
84	4.15	52.7	38.0	1.38
86	4.15	52.1	38.5	1.35
88	4.25	54.2	37.8	1.43
90	4.35	54.3	37.7	1.44
102*	2.40	40.4	49.0	0.83
92	3.70	54.2	38.0	1.43
100*	3.80	52.4	41.2	1.27
93	3.90	54.5	38.5	1.42
94	3.90	57.7	38.5	1.42
91	4.00	54.3	35.5	1.53
104	4.00	54.0	40.0	1.35
95	4.05	54.5	38.2	1.43
105	4.05	53.2	39.4	1.35
106	4.05	53.3	40.2	1.33
96	4.10	54.6	38.3	1.43
98	4.10	53.7	39.1	1.37
99	4.15	54.8	38.8	1.41
97	4.35	55.4	37.7	1.47
103	4.40	56.8	37.8	1.50
101†	5.70	61.7	31.6	1.95

Statement of Results.

a. Factory experiments.—For each pound of caseine and albumen in the water-free cheese there were from 1.33 to 1.44 pounds of fat, with an average of 1.38 pounds.

* Milk partially skimmed. † Cream added.

b. Station experiments.—The fat varied from 1.33 to 1.53 pounds, and averaged 1.39 pounds, for each pound of caseine and albumen in the cheese, when the milk was normal. In experiment 100, when the milk was about one-tenth skimmed, the amount of fat dropped to 1.27 pounds for a pound of caseine and albumen in the cheese, and in 102, when the milk was about two-fifths skimmed, the ratio dropped to 0.83.

INFLUENCE OF COMPOSITION OF MILK ON YIELD OF CHEESE.

Relation of Milk-Constituents to Yield of Cheese.

TABLE SHOWING RELATION OF MILK-CONSTITUENTS TO YIELD OF CHEESE.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of caseine and albumen in 100 lbs. of milk.	Pounds of green cheese made from 100 lbs. of milk.	Pounds of water in cheese made from 100 lbs. of milk.	Pounds of fat in cheese made from 100 lbs. of milk.	Pounds of caseine and albumen in cheese made from 100 lbs. of milk.	Pounds of sugar, ash, etc.
102*	2.40	3.47	10.00	4.27	2.31	2.81	0.61
92	3.70	2.99	10.20	3.84	3.45	2.41	0.50
100*	3.80	3.48	11.47	4.58	3.61	2.84	0.44
93	3.90	3.25	10.80	4.03	3.69	2.61	0.47
94	3.90	3.25	10.60	4.08	3.56	2.50	0.46
85	4.00	3.58	11.74	4.46	3.77	2.83	0.68
91	4.00	3.26	10.96	3.97	3.79	2.59	0.61
104	4.00	3.56	12.44	5.34	3.94	2.81	0.45
83	4.05	3.58	11.40	4.22	3.79	2.75	0.64
95	4.05	3.31	11.24	4.36	3.75	2.63	0.50
105	4.05	3.45	11.80	4.67	3.79	2.81	0.53
106	4.05	3.45	11.64	4.60	3.75	2.83	0.46
87	4.10	3.69	11.75	4.37	3.89	2.83	0.66
89	4.10	3.70	11.67	4.39	3.85	2.79	0.64
96	4.10	3.35	10.96	4.10	3.75	2.63	0.48
98	4.10	3.42	11.24	4.16	3.80	2.77	0.51
84	4.15	3.56	12.00	4.66	3.87	2.79	0.68
86	4.15	3.70	12.28	4.76	3.91	2.90	0.72
99	4.15	3.46	11.83	4.51	4.01	2.84	0.47
88	4.25	3.70	11.76	4.26	4.07	2.83	0.60
90	4.35	3.76	12.10	4.52	4.11	2.85	0.62
97	4.35	3.42	11.30	3.88	4.11	2.79	0.52
103	4.40	3.47	11.70	4.40	4.15	2.76	0.39
101†	5.70	3.32	14.16	5.40	5.40	2.77	0.59

* Milk partially skimmed.

† Cream added.

Yield of Green Cheese from One Hundred Pounds of Milk.

Statement of Results.

1. Pounds of cheese made from 100 pounds of milk.

a. Factory experiments.—The yield of cheese from 100 pounds of milk varied from 11.40 to 12.28 pounds, and averaged 11.84 pounds.

b. Station experiments.—The yield varied from 10 to 14.16 pounds, and averaged 11.40 pounds. Omitting the experiments in which abnormal milk was used the variation was from 10.60 to 12.44, with an average of 11.29 pounds.

2. Influence of stirred-curd and Cheddar processes upon yield of cheese.

NUMBER OF EXPERIMENT.	Process.	Pounds of cheese made from 100 lbs. of milk.
88.....	Cheddar	11.76
87.....	Stirred-curd	11.75

3. Influence of skimming milk upon yield of cheese.

NUMBER OF EXPERIMENT.	Kind of milk.	Pounds of cheese made from 100 lbs. of milk.	Pounds of fat in 100 lbs. of milk.
100.....	Skimmed	11.47	3.80
99.....	Whole-milk	11.83	4.15

The removal of 0.35 pounds of fat from the milk was accompanied by a reduction of 0.36 pounds in yield.

4. Influence of cutting curd in hard and soft condition upon yield of cheese.

NUMBER OF EXPERIMENT.	Condition of curd when cut.	Pounds of cheese made from 100 lbs. of milk.
84.....	Hard	12.00
83.....	Soft	11.40

The hard-cut curd made more cheese, which was mainly due to increased retention of water.

5. Influence of aerating milk by separator upon yield of cheese.

The separated milk in 94 and 96 produced a smaller yield of cheese than did the same milk unseparated as in 93 and 95.

6. Influence of retaining gases in milk and exposing to foul odors.

Under the conditions employed the retention of gases in milk and exposure to foul air did not apparently affect the yield as shown in experiments 91, 93 and 103. This is doubtless explained by the fact that the milk was taken from cows kept in the best condition, that the weather was cool and unfavorable to production of taint and that the manufacturing was done by experts. The experiments must be regarded as only preliminary and not conclusive for general conditions.

Amount of Water Retained in Cheese Made from 100 Pounds of Milk.

1. Average of results.

Taking all the experiments of October the water retained in the cheese made from 100 pounds of milk varied from 3.84 to 5.40 pounds, and averaged 4.41 pounds. Some of the more marked variations were due to especial conditions of manufacture, which we will now examine.

2. Influence of stirred-curd and Cheddar processes upon amount of water retained in cheese.

NUMBER OF EXPERIMENT.	Process.	Pounds of water in cheese made from 100 lbs. of milk.
88.....	Cheddar	4.26
87.....	Stirred-curd	4.37

The stirred-curd process retained more water.

3. Influence of cutting curd in hard and soft condition upon amount of water retained in cheese.

NUMBER OF EXPERIMENT.	Condition of curd when cut.	Pounds of water in cheese made from 100 lbs. of milk.
84.....	Hard	4.66
83.....	Soft	4.22

The hard-cut curd retained more moisture, holding 0.44 pounds more of water than the soft-cut curd.

Amount of Fat Retained in Cheese Made from 100 Pounds of Milk.

Statement of Results.

Grouping and averaging results, we have the following table:

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of fat in cheese made from 100 lbs of milk.	Increase of fat in 100 lbs. of milk.	Increase of fat in cheese made from 100 lbs. of milk.
102.....	2.40	2.31	.....	.....
92.....	3.70	3.45	1.30	1.14
100.....	3.80	3.61	1.40	1.30
93, 94.....	3.90	3.62	1.50	.31
85, 91, 104.....	4.00	3.80	1.60	1.49
83, 95, 105, 106.....	4.05	3.77	1.65	1.46
87, 89, 96, 98.....	4.10	3.82	1.70	1.51
84, 86, 99.....	4.15	3.93	1.75	1.62
88.....	4.25	4.07	1.85	1.76
90, 97.....	4.35	4.11	1.95	1.80
103.....	4.10	4.15	2.00	1.84
101.....	5.70	5.40	3.30	3.09

An examination of the last two columns in the preceding table indicates that when the fat in the milk increased the amount of fat retained in the cheese increased also, and, as a rule, followed quite closely the increase of fat in the milk, even in spite of marked variations in conditions of manufacture.

**Amount of Caseine and Albumen Retained in Cheese Made
from 100 Pounds of Milk.**

Statement of Results.

Taking all the experiments of October, the caseine and albumen varied from 3.25 to 3.76 pounds in 100 pounds of milk, while the caseine and albumen retained in the cheese made from 100 pounds of milk varied from 2.50 to 2.85 pounds. This indicates pretty close uniformity in respect to the amount of caseine and albumen of the milk retained in the cheese, even when the conditions of manufacture vary considerably.

90	.....	2.10	.....	1.80	.....	0.04	.....	0.26	.....
97	.....	1.30	.....	1.80	.....	.....	0.02	.....	0.48
103	.....	1.70	.....	1.84	.....	.....	0.05	.....	0.09
101	.....	4.16	.....	3.09	.....	.....	0.04	1.11	.....

The order of arrangement of experiments in the preceding table is based upon amount of fat in milk, commencing with the lowest. For further explanation, see report of Geo. A. Smith, in the Eighth Annual Report of the New York State Dairy Commissioner, and "Cheese Investigation and Experiments for May," in this report.

Statement of Results.

1. Influence of fat on yield of cheese.

In every case a portion of the increased yield of cheese was due to fat varying from 1.14 to 3.09 pounds for 100 pounds of milk. On an average about seventy-three per cent of the increase of yield was due to increase of fat in the milk.

2. Influence of caseine and albumen on yield of cheese.

As happened in the July and August experiments, so in the October experiments, it chanced that the cheese, made from the milk used in experiment 56, which contains the least amount of fat and which is therefore used as a basis for comparing yields, contains more caseine and albumen than most of the other cheeses. Hence, so far as the caseine and albumen had any effect on the yield, it was to diminish rather than to increase. There was a decreased amount of caseine and albumen in the cheese, averaging about 0.06 pounds.

3. Influence of water, ash, etc., on yield of cheese.

a. In eleven cases there was a decrease of water, ash, etc., varying from 0.02 to 0.54 pounds, and averaging 0.25 pounds.

b. In the other cases there was an increase of water, ash, etc., in the cheese varying from 0.10 to 1.11 pounds, and averaging about 0.39 pounds.

c. Averaging all the experiments, it appears that about eight per cent of the increase of yield was due to increase of water, ash, etc., in the cheese.

4. General summary.

Averaging all the experiments, we have the following:

	Pounds.	Per cent.
Average increased yield of cheese.....	1.61	....
Average increased yield of fat.....	1.59	98.8
Average decreased yield of caseine and albumen	0.06	3.7
Average increased yield of water, etc.....	0.08	4.9

Adjusting the gains and losses of yield, it appears that in the October experiments 95.3 per cent of the increased yield of cheese was due to increase of fat, 4.7 per cent to increase of water, ash, etc., while the caseine and albumen contributed nothing to increased yield.

Relation of Fat in Milk to Yield of Cheese.

TABLE SHOWING RELATION OF FAT IN MILK TO YIELD OF CHEESE.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.	Pounds of cheese made from 100 lbs. of milk.	Pounds of cheese made for each pound of fat in milk.
85.....	4.00	11.74	2.93
83.....	4.05	11.40	2.81
87.....	4.10	11.75	2.87
89.....	4.10	11.67	2.85
84.....	4.15	12.00	2.89
86.....	4.15	12.28	2.96
88.....	4.25	11.76	2.77
90.....	4.35	12.10	2.78
102*.....	2.40	10.00	4.16
92.....	3.70	10.20	2.76
100*.....	3.80	11.47	3.00
93.....	3.90	10.80	2.76
94.....	3.90	10.60	2.72
91.....	4.00	10.96	2.74
104.....	4.00	12.44	3.11
95.....	4.05	11.24	2.78
105.....	4.05	11.80	2.91
106.....	4.05	11.64	2.87
96.....	4.10	10.96	2.67
98.....	4.10	11.24	2.74
99.....	4.15	11.83	2.85
97.....	4.35	11.30	2.60
103.....	4.40	11.70	2.66
101†.....	5.70	14.16	2.49

* Milk partially skimmed. † Cream added.

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Statement of Results.

ds of cheese made for each pound of fat in milk.
dry experiments.—The amount of cheese made for each
fat in the milk varied from 2.77 to 2.96 pounds. The
was 2.86 pounds.
on experiments.—Omitting the experiments in which
milk was used, the others varied from 2.60 to 3.11
cheese for each pound of fat in milk; they averaged 2.73.
d 102 the ratio was greater, and in 101 it was less than
the normal milks.

TABULATED SUMMARY OF RESULTS.

NUMBER OF EXPERIMENT.	Pounds of fat in 100 lbs. of milk.		Pounds of fat lost in whey for 100 lbs. of milk.		Per cent of fat in milk lost in whey.		Pounds of caseine and albumen in 100 lbs. of milk.		Pounds of caseine and albumen lost in whey for 100 lbs. of milk.		Per cent of caseine and albumen in milk lost in whey.		Pounds of caseine in 100 lbs. of milk.		Pounds of albumen in 100 lbs. of milk.		Pounds of caseine for one lb. of albumen in milk.		Pounds of fat for one lb. of caseine and albumen in milk.	
	Normal milk, 98.	Normal milk, 94.	Normal milk, 98.	Normal milk, 94.	Normal milk, 98.	Normal milk, 94.	Normal milk, 98.	Normal milk, 94.	Normal milk, 98.	Normal milk, 94.	Normal milk, 98.	Normal milk, 94.	Normal milk, 98.	Normal milk, 94.	Normal milk, 98.	Normal milk, 94.	Normal milk, 98.	Normal milk, 94.	Normal milk, 98.	Normal milk, 94.
.....	4.70	4.70	0.30	0.30	6.10	6.10	2.88	2.88	0.36	0.36	52.07	52.07	2.88	2.88	0.42	0.42	4.2	4.2	1.34	1.34
.....	4.90	4.90	0.32	0.32	6.30	6.30	3.25	3.25	0.70	0.70	31.40	31.40	3.25	3.25	0.64	0.64	4.3	4.3	1.30	1.30
.....	4.06	4.06	0.33	0.33	6.15	6.15	3.45	3.45	0.74	0.74	31.33	31.33	3.45	3.45	0.61	0.61	4.1	4.1	1.15	1.15
.....	4.10	4.10	0.34	0.34	6.30	6.30	3.54	3.54	0.77	0.77	31.16	31.16	3.54	3.54	0.60	0.60	4.1	4.1	1.17	1.17
.....	4.15	4.15	0.31	0.31	7.47	7.47	3.57	3.57	0.83	0.83	33.00	33.00	3.57	3.57	0.73	0.73	4.1	4.1	1.16	1.16
.....	4.35	4.35	0.36	0.36	6.12	6.12	3.70	3.70	0.80	0.80	34.33	34.33	3.70	3.70	0.71	0.71	4.3	4.3	1.17	1.17
.....	4.35	4.35	0.31	0.31	7.12	7.12	3.59	3.59	0.84	0.84	33.40	33.40	3.59	3.59	0.69	0.69	4.3	4.3	1.16	1.16
.....	4.40	4.40	0.30	0.30	6.59	6.59	3.47	3.47	0.78	0.78	31.04	31.04	3.47	3.47	0.63	0.63	4.5	4.5	1.31	1.31
.....	4.40	4.40	0.16	0.16	6.67	6.67	3.47	3.47	0.73	0.73	30.73	30.73	3.47	3.47	0.67	0.67	4.1	4.1	1.27	1.27
.....	5.30	5.30	0.37	0.37	7.10	7.10	3.49	3.49	0.74	0.74	31.26	31.26	3.49	3.49	0.67	0.67	4.2	4.2	1.09	1.09
.....	5.70	5.70	0.43	0.43	7.37	7.37	3.32	3.32	0.69	0.69	30.45	30.45	3.32	3.32	0.61	0.61	4.4	4.4	1.71	1.71
.....	4.14	4.14	0.31	0.31	7.50	7.50	3.66	3.66	0.83	0.83	34.04	34.04	3.66	3.66	0.73	0.73	4.5	4.5	1.13	1.13
.....	4.04	4.04	0.30	0.30	7.43	7.43	3.37	3.37	0.73	0.73	31.37	31.37	3.37	3.37	0.61	0.61	4.5	4.5	1.30	1.30
.....	4.06	4.06	0.31	0.31	7.50	7.50	3.47	3.47	0.77	0.77	33.43	33.43	3.47	3.47	0.67	0.67	4.2	4.2	1.19	1.19
.....	4.04	4.04	0.30	0.30	7.43	7.43	3.37	3.37	0.72	0.72	31.37	31.37	3.37	3.37	0.61	0.61	4.5	4.5	1.30	1.30
.....	4.06	4.06	0.31	0.31	7.50	7.50	3.47	3.47	0.77	0.77	33.43	33.43	3.47	3.47	0.67	0.67	4.2	4.2	1.19	1.19

SUMMARY OF RESULTS.

I. Loss of Milk-Constituents in Cheese-making.

1. *Fat.*

a. The actual amount of fat lost in the whey for 100 pounds of milk was fairly uniform under the same conditions of manufacture, and was practically independent of the amount of fat in the milk.

b. The average amount of fat lost in the whey, in all the experiments, was 0.31 pounds (nearly five ounces) for 100 pounds of milk, which was about 7.60 per cent of the fat in the milk. In the factory experiments, the average loss was 7.50 per cent of the fat in the milk; in the station experiments, it was 7.42 per cent of the fat in the milk.

2. *Caseine and albumen.*

a. The amount of caseine and albumen lost in the whey was quite uniform under all the conditions tried.

b. The average amount of caseine and albumen lost in the whey, in all the October experiments was about 0.77 pounds (about twelve ounces) for 100 pounds of milk, which was about 22.5 per cent of the caseine and albumen in the milk.

c. Taking all the milks the caseine averaged 2.80 pounds and the albumen 0.67 pounds in 100 pounds of milk; for every pound of albumen there were 4.2 pounds of caseine.

II. Influence of Composition of Milk on Composition of Cheese.

1. *Fat.*

a. In the cheese made from normal milk the amount of fat in 100 pounds of green cheese varied from about thirty-two to thirty-six pounds, and averaged about thirty-three pounds. In the cheese made from milk a little less than one-half skimmed the fat was diminished to 23.13 pounds; and to 31.50 pounds in the milk that was one-tenth skimmed. Addition of cream increased fat to 38.13 pounds.

2. *Caseine and albumen.*

a. In the cheese made from the normal milks, the amount of caseine and albumen in 100 pounds of cheese was a fairly uniform quantity, varying in the green cheese from 22.91 to 24.76 pounds. Skimming the milk nearly one-half, increased the per cent of caseine and albumen in the cheese to 28.10 pounds. Adding cream diminished the quantity to 19.53 pounds.

3. *Relation of fat to caseine and albumen in cheese as a basis for determining the character of milk.*

a. The results appear to indicate that in cheese made from normal milk containing from 3.9 to 4.4 pounds of fat in 100 pounds of milk, there should be about 1.3 to 1.5 pounds of fat for one pound of caseine and albumen in the water-free cheese. Skimming nearly one-half reduced this ratio to 0.83 pounds; one-tenth skimming reduced it to 1.27 pounds.

III. Influence of Composition of Milk on Yield of Cheese.

1. *Fat.*

a. Of the increased yield of cheese obtained in the various experiments, 95.3 per cent of the increase, on an average, was due to an increase of fat in the milk from which the cheese was made.

b. The amount of fat retained in the cheese made from 100 pounds of milk increased when the amount of fat in the milk increased, but not with exact uniformity.

2. *Caseine and albumen.*

a. There was no increase of caseine and albumen in the milk, and hence no increased yield of cheese due to caseine and albumen.

3. *Water.*

a. About 4.7 per cent of the increased yield of cheese was due to an increased amount of water retained in the cheese.

b. The amount of water retained in the cheese made from 100 pounds of milk was quite variable and appeared to be dependent upon conditions of manufacture more than upon the composition of the milk.

IV. Yield of Cheese.

1. *Pounds of cheese made from milk.*

a. Of the factory milk, there were required, on an average, 8.45 pounds to make one pound of cheese.

b. Of the station milk, 8.77 pounds sufficed to make one pound of cheese.

c. One hundred pounds of factory milk, made, on an average, 11.84 pounds of green cheese; 100 pounds of station milk made 11.40 pounds of green cheese.

V. Influence of Variation of Conditions of Manufacture.

1. *Variation in amount of rennet used.*

a. Loss of milk-constituents.—The use of a large amount of rennet was accompanied by a little larger loss of fat in one case and a less loss in another.

b. Yield.—The yield was slightly greater with the larger amount of rennet, owing to retention of water.

2. *Cutting curd in hard and soft condition.*

a. Loss of milk-constituents.—Hard cutting gave larger loss of fat.

b. Yield.—The hard cutting gave a larger yield, owing largely to retention of more moisture.

3. *Comparison of stirred-curd and Cheddar processes.*

a. Loss of milk-constituents.—The results were about the same.

b. Yield.—The Cheddar process gave the same yield as the stirred-curd process.

4. *Aerating milk by separator.*

a. Loss of milk-constituents.—The loss of fat was a little greater in the separated milk.

b. Yield.—The separated milk gave a little smaller yield of cheese.

Exposing milk to foul odors and retaining gases in milk.

as of milk-constituents.—Under the conditions employed, was not increased, but the experiments must be regarded minary and not conclusive for general conditions. eld.—The yield was not affected.

6. *Dilution with water.*

as of milk-constituents.—The loss of fat was slightly above age loss. eld.—The yield was not apparently diminished.

Respectfully yours,

W. W. HALL,
Cheese Instructor.

Report of M. T. Morgan.

Hon. J. K. BROWN, *New York State Dairy Commissioner:*

Sir.—I respectfully submit the following, as a report of the work performed by me for the year ending September 30, 1892.

During the month of October, 1891, I visited factories in Madison, Otsego, Herkimer and Chautauqua counties. At the beginning of the month in some of the factories, they had commenced to skim their night's milk, and manufacture a night-skim-cheese, believing that more money could be obtained by so doing. The full-cream factories, fearing that the returns at such factories would be greater for the amount of milk manufactured than at their factories, endeavored to offset this by so manufacturing their cheese that they would retain more moisture, thus giving a greater amount of cheese to the pound of milk. Many of them carried it so far that their cheese appeared mushy and lacked body. After a little experience of this kind it was concluded that a change would be beneficial to the product; a dryer curd was made and there was no more difficulty. About the twentieth of the month I was directed to procure some samples of milk, cheese and whey from different localities in Chautauqua county. I obtained these from Sinclairville, Findley's Lake and the western part of the county; some of these were my own make and I sent them to the experiment station at Geneva for analysis.

In December I used the Babcock milk test in some of the milk stations along the Delaware, Lackawanna and Western railroad, at the request of the proprietor, to ascertain the difference of the amount of fat in the milk delivered by each patron; I also made lists of different herds owned by farmers to ascertain the merits of each individual cow for butter. These lists proved very satisfactory to all who saw them made.

In January, 1892, in company with Mr. W. W. Hall, we held several meetings in Oneida and Lewis counties; these meetings were held at the request of factory owners and cheesemakers, who wished their patrons to listen to our ideas of the care of milk to be manufactured into butter and cheese. As a rule, these gatherings were attended by a class of dairy farmers who do not attend the farmers' institutes, but would spend a day to go to some convenient place near home if, by so doing, they could get instructions on dairy topics. They seem to feel more free to ask questions on topics of interest to them than they would at some larger hall where more people congregate and where, in many instances, they would go away without gaining information upon points that most interest them. We have endeavored to make the proper care of milk for the purpose of being manufactured into cheese our special theme, and have given our personal experience and facts obtained from others who have a practical knowledge as to what is required for that purpose, such as aeration, cleanliness, kindness to cows, ventilation, and so forth, and I am pleased to learn from the cheesemakers that the meetings held were productive of good results. Mr. Hall, with the Babcock test, was one of the great features of each meeting, and helped to make it interesting and beneficial; many expressed their surprise at the amount of fat there was contained in samples that they brought.

In the month of February I worked testing milk at the milk stations on the Delaware, Lackawanna and Western railroad, between Richfield Springs and Binghamton, under the supervision of Assistant Commissioner Peter H. Parker of the sixth division. I continued this work until about the fifteenth of March, when I received calls from some factory men to attend their annual factory meeting and advise their patrons as to the best manner to care for their milk. Mr. Hall was in attendance at one of the meetings, and I wish to call your special attention to this particular one. Mr. Usher Holmes, of Brookfield, called together the patrons of his three factories at his home factory, and there we held a three hours' meeting and all were very much interested. Mr. Holmes informed me in November last that the information his patrons received at that gather-

ing was of great help to him, for all of them were taking better care of their milk and as a result he had not received a rejection from a buyer during the past season, and his goods brought the highest market prices. I have had very satisfactory reports from all who became interested in the instructions given at different times at these meetings.

During the months of April and May I was busy by being called to factories that were opened, to advise as to the best method of producing a good fodder cheese, and why it took so great an amount of milk for a pound of cheese in the spring. These questions and facts seemed to be uppermost in the minds of makers and patrons, and many of them were almost spoiling their cheese by trying to use less milk for a pound of cheese. The first week in May, in company with Messrs. G. A. Smith and W. W. Hall, I went to the celebrated Merry factory at Verona, Oneida county, to make experiments for the purpose of finding out why it takes so much milk in spring for a pound of cheese. We were assisted by Dr. Van Slyke of the experiment station at Geneva; we reached some conclusions of which Mr. Smith gives a full and detailed account. Mr. Merry being sick at that time, his factory was in charge of his son who also rendered valuable assistance.

The month of June was one of the busiest months of the year, there not being days enough to fill one-half the applications for work in the dairy counties of the central part of the State. The most pronounced difficulty seemed to be the same as in the early part of the season: not body enough to the cheese for the amount of milk required to make a pound; the milk, as a rule, seemed to be thin and light in solids. This, in my opinion as well as that of others of more experience, was owing to the pastures not producing as good solid food as usual, on account of the excessive rain and little sunshine. The makers becoming aware of that fact began to make better goods and let the ratio take care of itself; it stimulated them to urge upon the patron the necessity of thorough aeration and better care, as that assisted greatly in reducing the ratio, by getting rid of the gas and other impurities often contained in milk. The

cheese made in the month of June was less, in proportion to the amount of milk produced, than in June of any year since my connection with the department.

The first week in July I accompanied Mr. G. A. Smith to Lacona, Oswego county, and there spent a week, at Mr. Finster's factory, making cheese; we afterward obtained samples for analyses and sent them to Dr. Collier at the experiment station at Geneva, a detailed report of which is made by Mr. Smith. About the tenth of July I accompanied Mr. W. W. Hall to Chautauqua county for a time; he with the Babcock test and as an instructor also; we visited as many factories as we could in the time allotted us for that section; we did very little work together, except in instances where they wanted the test operated and some instructions given about the Cheddar process adopted by the dairy department of the State. Walter J. Corbitt, our agent located at Sherman, arranged for the work, and I assure you we did not want for work to do under his supervision. Mr. Corbitt informs me that our work was in every respect satisfactory. The first week in August I was at Rice's, Jefferson county; E. A. Ayers factory; with Mr. Smith and Mr. Rees, making cheese to be used for experimental purposes at the station at Geneva: while there our work was inspected by Assistant Commissioner Charles D. Moore of the fifth division; while in that county I visited a few of the factories, at the request of some of those employed by you in the department, to ascertain, if possible, the cause of certain flavors produced in cheese made in those localities. The results of this work proved not as satisfactory to the cheese-makers as I wished it might.

The last week in the month I worked with Mr. G. A. Smith, at Geneva. The work at the station Mr. Smith is much more familiar with and better able to report than I am, but I feel that it would be but just to say that the work done at the station cannot be too highly appreciated by the farmers of the State of New York, and that there has been many important facts of value given to the people which, if they will give them thought and attention, will pay them many fold.

In September, my work was confined to the southern part of the State, where the dairymen think it a loss to try and work all the fat into cheese, milk being so rich at that season, believing it to be a saving. In most instances they were convinced that there was no greater loss perceptible according to the amount of fat contained than any other season of the year, but still think there is a little more money in the skim-cheese.

In conclusion, permit me to say that this has been the most successful season, for the dairy department, or, rather, to the branch with which I am connected, than any preceding year since my connection with it, and I feel greater satisfaction on my part than ever before.

Yours respectfully,

M. T. MORGAN,
Cheese Instructor.

Report of H. A. Rees.

HON. JOSIAH K. BROWN, *New York State Dairy Commissioner,*
Albany, N. Y.

Dear Sir.—I respectfully submit the following as a report of the work performed by me for the year ending September 30, 1892.

During the month of October, 1891, I worked in the counties of Lewis, Oneida and Oswego, testing milk and making cheese.

The first week in November I was in Lewis county making cheese at different factories, and the nineteenth, went to Orwell, Oswego county, to attend court.

During the months of December, January and February, I spent a large portion of the time among the farmers of Lewis county testing milk—using the Babcock test—and giving instruction as to the best methods of butter making.

In March and April I attended a number of annual factory meetings, and I consider the time spent at those meetings very profitable, having a marked effect on the quality of cheese made at those factories. In several cases where I attended the meetings, the maker did not have a single rejection during the season of cheese-making, and I think there is no way that I can spend a day that will be of more value to the farmer, for there I can talk direct to them and convince them that the better care they take of their milk the more cheese can be made from the same quantity of milk, and also a much better quality. The first step in the improvement of cheese-making must be taken by the farmer in the care of his milk, and the care and feeding of his cows.

The first week in May I spent at the Merry factory, in Oneida county, with Messrs. G. A. Smith, W. W. Hall and M. T. Morgan, in testing milk with the Babcock test and making cheese. The rest of the month I worked in Lewis county, giving

information to the cheesemakers in the modified Cheddar process of cheese-making.

The first week in June I was in the western part of Lewis county; was called there by a cheesemaker who wanted milk tested and, also, instruction in making Twin cheese. I visited several other factories in that section, and while there was called to Oneida county. The maker was having trouble with his cheese; he could not get the moisture out of the curd. The thirteenth I went to Highmarket, Lewis county, with Mr. G. A. Smith; the maker was having difficulty with his cheese; they seemed to sweat or leak whey the first ten days after being made. I spent several days in that part of the county testing milk and making cheese. I was called to one factory where they were having trouble with their cheese on account of milk that was overripe. I called in the farmers to see the milk tested. I gave them a talk on the care of milk. I was there again the next week and the maker informed me he had not had a poor mess of milk since I was there the week before. Spent the rest of the month in Oneida and Lewis counties.

During the first part of July I was in the counties of Oneida, Jefferson and Oswego. The latter part of the month I was in Lewis and Oneida counties. The twenty-ninth I went to the Merry factory in Oneida county and helped Messrs. G. A. Smith and M. T. Morgan in testing milk and making cheese for a week. Then I was called to a factory in Lewis county by the salesman. They had been having considerable trouble with tainted milk and were having spongy curds. I found several dairies of milk badly tainted. I talked with those patrons about their milk, and suggested that they set their wagons where the air would be pure and free from bad odors. The next day the milk was much better, with one exception; this patron said he set his wagon where the air was pure, and he could not tell why his milk was tainted; said he run his milk through an aerator, and did everything possible in order to have the milk pure; he wished me to call at his farm and see if I could discover any thing wrong. I did as he requested and found one cow with a sore on her bag, and another that was due to be fresh in milk in about three weeks.

I asked him to keep these two cows' milk separate. He did so, and the next time I called at the factory the maker informed me that the milk was all right and that he was making good cheese. Spent the latter part of the month in Jefferson county. At a butter conference held by W. H. Gilbert I tested the milk which was brought to the factory by the farmers. Some of the milk showed a very high per cent of butter fat. One sample of milk from a thoroughbred Jersey cow tested ten and one-fifth butter fat.

In closing I beg to say, that owing to the limited number engaged in this work, it has been utterly impossible to give as much time to some cases as it seemed necessary. But we have, however, under the existing circumstances, done the best possible.

Hoping that this report will meet with your approval, I remain

Yours respectfully,

H. A. REES,
Cheese Instructor.

Report of R. D. Clark, M. D.

Hon. J. K. BROWN, *New York State Dairy Commissioner*

Dear Sir.—I have the honor to submit the following work done by me.

Vinegar Work.

March 25, 1892, I made up two samples of vinegar each contained 2.35 per cent of cider vinegar solids—taining exactly 4 per cent and the other 4.5 per cent acet for the use of the legislative committee in considering t lower the standard for acetic acid in vinegar.

May twenty-sixth, in company with J. E. Ryan, I Gloversville and inspected the vinegar of dealers there. D month of June I helped to inspect the vinegar sold in th Albany.

August 8, 1892, I inspected the vinegar in the retail gro provision stores in the village of Chestertown, Warren N. Y., five in all; also, the milk from the wagons of the

August ninth and tenth did the same in the village of ' burgh, in the same county. There were seven stores in th which sold vinegar.

On the eleventh of August I inspected the vinegar in stores which handled vinegar in Luzerne, Warren count also the milk.

The twelfth of August I was in Corinth. In lage there were four stores which sold vinegar, : peddlers of milk. With a few exceptions the vine by these dealers was made by themselves. The is to send the apples to a mill in the vicinity, a them ground and pressed into cider, for which they pa barrel. The cider is then taken home and placed in t

or in the back yard till the owner thinks it is fit for vinegar. They knew but little about the requirements of the law and some did know there was a law governing the sale of vinegar. Considerable pains to instruct them how to test the vinegar, and gave each a copy of the law, stating that they would be held strictly accountable to its provisions. The vinegar in these villages was of uniformly good quality.

Vinegar Analyses.*

SAMPLE NUMBER.	CONTAINED BY ANALYSES.				CONTAINED BY ACETO-HYDROMETER AND ACETOMETER.		
	Water.	Solids.	Acidity.	Ash.	Solids.	Acidity.	Pl. Acetate.
413.....	99.681	.319	4.25	.....	.....	.....	.....
51.....	99.719	.281	4.95	.....	.....	.....	.....
Old beer.....	97.67	2.33	1.31	.....	.....	.....	.....
305.....	99.808	.192	4.867	.....	.....	.....	.....
306.....	99.763	.237	4.64	.....	.....	.....	.....
307.....	99.636	.364	4.28	.....	.....	.....	.....
308.....	99.666	.334	4.34	.....	.....	.....	Gave some.
309.....	97.40	2.60	3.12	.....	.....	.....	.....
311.....	99.719	.281	4.42	.....	.....	.....	.....
389.....	99.711	.289	4.37	.....	.....	.....	.....
1.....	97.65	2.35	4.00	.....	.....	.....	.....
2.....	97.65	2.35	4.50	.....	.....	.....	.....
1.....	97.90	2.10	4.703	.....	.....	.....	Slightly flor.
2.....	98.35	1.65	4.498	.....	.....	.....	.....
590.....	99.806	.194	4.212	.....	.....	.....	.....

* In most cases these analyses were made in duplicate.

* In most cases these analyses were made in duplicate. † Ash was alkaline.

Vinegar Cases.

The following are the vinegar cases in which I have been called into court to give testimony:

Sample No. 177. Received from Simon Nussbaum, January 15, 1891. Analysis showed it to contain acetic acid, 3.48 per cent; solids, .196 per cent. It contained no other than acetic acid and was not cider vinegar. It was colored in semblance of cider vinegar. A certified statement of these results was sent to the capitol, February 4, 1891. Appeared in police court, Troy, March seventh; grand jury some time in March or April; Supreme Court September 30, October 3 and 4, 1892.

Sample No. 178. Received from Simon Nussbaum and James E. Ryan, January 16, 1891. It contained 3.082 per cent acetic acid and 1.849 per cent solids. It contained malic acid, but no foreign acid. It was cider vinegar, but below the legislative standard. Certificate of analysis was sent to the capitol January 26, 1891.

Sample No. 179 was received from Simon Nussbaum, January 21, 1891. It contained acetic acid 3.74 per cent, solids .244 per cent. It was not cider vinegar and was colored in semblance of cider vinegar. Certificate was sent to capitol February 4, 1891. Appeared in the police court, January 29 and 30 at Troy, February 14 and 19, 1891.

Sample No. 180 was received from James E. Ryan, March 4, 1891. It contained acetic acid 5.78 per cent, solids 0.285 per cent. It was not cider vinegar, but was colored in semblance of cider vinegar. A certificate of these results was sent to the capitol April 8, 1891. Appeared in police court at Schenectady, April 20, May 7, 14, 22, 29; before grand jury September 16; Supreme Court, November 10, 12, 13, 1891, May 4, 13, 18, 26 and 29, 1892.

Oleomargarine.

During the months of February and March I visited the restaurants, boarding-houses and hotels of Albany, and inspected the butter served to guests, but found no spurious butter served. Also inspected butter in Cohoes and Waterford. Have from time to time assisted in inspecting butter throughout our own and neighboring cities.

On April seventh I went to Syracuse to assist chemist in making analysis of suspected butter.

Since last reported I have received four samples of suspected butter from Chas. Kellogg of Waterford, N. Y.; two samples from Assistant Commissioner J. H. Brown, Utica, N. Y.; one sample from Simon Nussbaum, Albany, N. Y.; one from Dr. M. Cavana, Oneida, N. Y.; one from Geo. H. Crofft, Waverly, N. Y.; two from Bairbridge, N. Y., and one from James A. Chambers. They were all submitted to chemical analysis and found to be genuine butter, and certificates were sent to the capitol as well as to the persons sending the samples.

Factory Inspection (Milk).

August 17, 1892, in company with Assistant Commissioner George L. Flanders, I inspected the milk delivered at the Peru cheese factory. There were sixty-three samples delivered and sixty-three inspections made. Samples Nos. 3958, 3959 and 3960 were taken and brought to Albany for analyses, the result of which will be found elsewhere in this report.

On August 21, 1892, in company with S. Nussbaum, I inspected the milk delivered at North Granville cheese factory; forty-six samples were inspected and all found to be of legal standard. On the same day inspected the milk delivered at the Middle Granville cheese factory; eighteen samples were inspected, all being of legal standard.

On August 23, 1892, with Simon Nussbaum, inspected the milk delivered at North Hebron cheese factory; twenty-seven inspections were made and all were up to the legal requirements.

On the twenty-fourth of the same month, we examined the milk delivered at the Salem cheese factory. There were twenty-five samples inspected, all of which, except two — Nos. 3961 and 3962 — were legal milk. These two samples were found upon analysis to be adulterated and action was brought, the history of which will be found elsewhere in this report.

MILK ANALYSES.

Since last report I have received and analyzed the following samples of milk:

First Division.

SAMPLE NUMBER.	Water.	Solids.	Fat.	Curd.	Ash.
1339*	.....	.....	.....	.....	.....
1340.....	90.11	9.89	3.15	6.22	.52
1373.....	89.76	10.24	3.30	6.38	.56
1372.....	88.25	11.75	3.56	.....	.65
1341.....	89.41	10.59	3.08	.....	.63
2304.....	88.16	11.84	3.42	7.72	.70
2306.....	89.16	10.84	3.40	6.91	.53
2307.....	88.81	11.19	3.97	6.68	.54
2811.....	88.03	11.97	3.44	7.94	.59
2808.....	86.90	13.10	3.75	.....	.....
2816.....	88.782	11.218	2.59	.....	.623
2812.....	87.97	12.03	3.45	.....	.....
2535.....	90.091	9.909	2.87	6.519	.52
17*.....	.....	.....	.....	.....	.....
2817.....	88.25	11.75	2.81	8.29	.65
3438.....	90.286	9.714	2.45	.....	.55
1342.....	88.09	11.91	3.78	.....	.....
1343.....	87.85	12.15	3.87	.....	.....
3439.....	88.92	11.08	3.88	.....	.58
3440.....	88.85	11.15	3.38	.....	.55
3441.....	92.76	7.24	2.03	.....	.86
3442†.....	.....	.....	.....	.....	.....

* Sour ; not analyzed.

† Curdled ; not analyzed.

MILK ANALYSES, WITH DATE OF TAKING SAMPLE.

First Division.

DATE.	Sample number.	Water.	Solids.	Fat.	Curd.	Ash.
Sept. 18, 1891	3443	88.54	11.46	3.75	.....	.61
October 6, 1891	3444	89.67	10.33	2.942	6.83	.566
October 15, 1891	3445	87.32	12.68	3.83	8.18	.670
October 22, 1891	1	87.00	13.00	4.64	7.713	.647
October 22, 1891	2	88.31	11.69	3.12	7.92	.650
October 22, 1891	3	88.16	11.84	3.82	7.40	.620
October 29, 1891	3446	86.85	13.15	4.02	8.493	.637
Dec. 2, 1891	2952	89.30	10.70	3.23	6.92	.55
Dec. 2, 1891	2953	88.88	11.12	3.59	6.96	.57
Feb. 17, 1892	3447	89.09	10.91	3.36	7.04	.51
Feb. 18, 1892	3448	88.33	11.67	4.06	7.06	.55
Feb. 19, 1892	3449	89.97	10.03	3.19	6.34	.50
Feb. 23, 1892	3450	89.35	10.65	2.96	7.17	.52
April 5, 1892	3451	89.47	10.53	3.33	6.71	.49
April 6, 1892	3452	89.52	10.48	3.05	6.89	.54
April 6, 1892	3453	89.39	10.61	2.98	7.02	.61
April 6, 1892	3454	89.64	10.36	3.08	6.81	.47
April 6, 1892	3455	89.44	10.56	3.33	6.67	.56
June 1, 1892	3456	92.86	7.14	1.98	4.77	.39
June 1, 1892	3458	92.82	7.18	1.93	4.87	.38
June 8, 1892	3459	89.15	10.85	2.93	7.35	.57
June 8, 1892	3460	89.11	10.89	3.20	7.14	.55
June 13, 1892	3457	89.20	10.80	3.03	7.25	.52
June 15, 1892	1	87.12	12.88	3.65	8.63	.60
June 15, 1892	2	87.80	12.20	3.40	8.24	.56
June 16, 1892	3461	89.66	10.34	2.99	6.81	.54
June 16, 1892	3863	88.75	11.25	3.85	6.87	.53
June 21, 1892	3864	89.71	10.29	3.02	6.74	.53
June 23, 1892	2963	89.87	10.3	2.02	7.59	.52
June 23, 1892	3865	88.68	11.32	3.72	7.08	.52
June 23, 1892	3866	88.32	11.68	3.85	7.28	.55
July 12, 1892	3867	87.08	12.92	4.75	7.57	.60
July 15, 1892	3868	90.09	9.91	3.04	6.32	.55
July 18, 1892	3869	88.46	11.54	3.61	7.41	.52
July 22, 1892	3870	89.62	10.38	2.69	7.03	.66
August 24, 1892	3961	88.35	11.65	3.91	7.20	.54
August 24, 1892	3962	88.48	11.52	3.47	7.40	.63
Sept. 8, 1892	3871	88.40	11.60	3.77	7.33	.50
Sept. 12, 1892	3872	88.93	11.07	2.93	7.61	.53
Sept. 12, 1892	3873	88.10	11.90	4.04	7.32	.54
Sept. 28, 1892	3876	88.31	11.69	3.85	7.34	.50
October 10, 1892	3874	89.66	10.34	3.09	6.72	.53
October 20, 1892	*	87.93	12.07	3.89	7.62	.56

MILK ANALYSES, WITH DATE OF TAKING SAMPLE — (*Concluded*).

Fifth Division.

DATE.	Sample number.	Water.	Solids.	Fat.	Curd.	Ash.
August 18, 1892	3958	89.75	10.25	3.23	6.56	.46
August 18, 1892	3959	88.97	11.03	3.48	7.03	.52
August 18, 1892	3960	89.09	10.91	3.26	7.10	.55

Sixth Division.

.....	1	90.83	9.17	2.54	Lost,
.....	2	87.26	12.74	3.5966

Seventh Division.

Nov. 4, 1892	*
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Milk Cases.

The following is a record of the milk samples in which I have been called into court to give testimony:

Sample No. 1340 was taken by Assistant Commissioner George L. Flanders and myself, at North Granville, Washington county. By analysis it contained water, 90.11 per cent; total solids, 9.89 per cent; fat, 3.15 per cent; curd, 6.22 per cent; salts, .52 per cent; calculating from the basis of the legislative standard of twelve per cent of solids there had been at least 17 per cent of water added.

Sample No. 1373 was taken at the same time and same place, and by analysis contained water, 89.76 per cent; solids, 10.24 per cent; fat, 3.30 per cent; curd, 6.38 per cent; salts, .56 per cent. There had been at least 14 per cent of water added.

Samples Nos. 1372 and 1341, were taken from the same factory a month later by same parties. Analyses showed 1372 to contain water, 88.25 per cent; solids, 11.75 per cent; fat, 3.56 per cent; curd, 7.54 per cent; salts, .65 per cent. There had been at least 2 per cent of water added. No. 1341 contained water, 89.41 per cent; solids, 10.59 per cent; fat, 3.08 per cent;

* Elmira sample.

curd, 6.88 per cent; salts, .63 per cent. At least 11 per cent of water added. Appeared at Court of Special Sessions, at Fort Edward, in the above cases, September 19, 25, and October 1, 1891.

Sample No. 2304 was received from Simon Nussbaum and contained water, 88.16 per cent; solids, 11.84 per cent; fat, 3.42 per cent; curd, 7.72 per cent; salts, .70 per cent. At least 1 per cent of water added. Appeared in police court, Troy, N. Y., November 18, 1890.

Samples Nos. 2306, 2307 and 2811 were received from Geo. B. Fellows. No. 2306 contained water, 89.15 per cent; solids, 10.84 per cent; fat, 3.40 per cent; curd, 6.91 per cent; salts, .53 per cent. At least 9 per cent of water added. No. 2307 contained water, 88.81 per cent; solids, 11.19 per cent; fat, 3.97 per cent; curd, 6.68 per cent; salts, .54 per cent. Had been at least 6 per cent of water added. No. 2811 contained water, 88.03 per cent; solids, 11.97 per cent; fat, 3.44 per cent; curd, 7.94 per cent; salts, .59 per cent. This was too close to standard to prosecute.

Sample No. 2816 was received from Simon Nussbaum and contained water, 88.782 per cent; solids, 11.218 per cent; fat, 2.59 per cent; curd, 8.005 per cent; salts, .623 per cent. Had at least 6 per cent of water added.

Sample No. 2535 was received from R. H. Palmer, and contained water, 90.091 per cent; solids, 9.909 per cent; fat, 2.87 per cent; curd, 6.519 per cent; salts, .52 per cent. At least 17 per cent of water added.

Sample No. 2817 was received from Simon Nussbaum and contained water, 88.25 per cent; solids, 11.75 per cent; fat, 2.81 per cent; curd, 8.29 per cent; salts, .65 per cent. At least 2 per cent of water added.

Sample No. 3438 was received from Simon Nussbaum and Charles Burke and contained water, 90.286 per cent; solids, 9.714 per cent; fat, 2.45 per cent; curd, 6.714 per cent; salts, .55 per cent. Had at least 19 per cent of water added. Appeared in police court, Albany, N. Y., August 18, 1891.

Sample No. 3439 was received from Charles Burke and contained water, 88.92 per cent; solids, 11.08 per cent; fat, 3.88 per cent; curd, 6.63 per cent; salts, .58 per cent. At least 7 per cent of

water was added. Appeared in police court, August 21, 1891, September twenty-fourth, September twenty-fifth, again September twenty-ninth.

Samples Nos. 3440 and 3441 were received from Simon Nussbaum August 22, 1891. No. 3440 contained water, 88.85 per cent; solids, 11.15 per cent; fat, 3.38 per cent; curd, 7.22 per cent; salts, .55 per cent. There was at least 7 per cent of water added. No. 3441 contained water, 92.76 per cent; solids, 7.24 per cent; fat, 2.03 per cent; curd, 4.85 per cent; salts, .36 per cent. Water added at least 39 per cent.

Sample No. 3443 was received from Charles Burke and George B. Fellows, September 18, 1891, from Garrettsville, N. Y. It contained water, 88.54 per cent; solids, 11.40 per cent; fat, 3.75 per cent; curd, 7.04 per cent; salts, .61 per cent. Five per cent of water was added. Case was settled by management of the cheese factory from which it was taken.

Sample No. 3444, from Charles Burke, October 6, 1891, at the capitol, and contained water, 88.67 per cent; solids, 10.33 per cent; fat, 2.942 per cent; curd, 6.83 per cent; salts, .566 per cent. At least 13 per cent of water added. Appeared in police court, Albany, N. Y., October seventeenth, nineteenth and twenty-first.

Sample No. 3445 received from Charles Burke and Simon Nussbaum, October 5, 1891, and contained water, 87.52 per cent; solids, 12.68 per cent; fat, 3.83 per cent; curd, 8.18 per cent; salts, .67 per cent. This sample was suspected of containing boracic acid, but, upon examination, was found to be free from that preservative.

Three samples, marked Nos. 1, 2 and 3, were received from a cheese factory at Plattsburgh, on October 22, 1891. No. 1 was normal milk. No. 2 contained water, 88.31 per cent; solids, 11.69 per cent; fat, 3.12 per cent; curd, 7.92 per cent; salts, .765 per cent. There was at least two per cent of water added. No. 3 contained water, 88.16 per cent; solids, 11.84 per cent; fat, 3.83 per cent; curd, 7.40 per cent; salts, .62 per cent. At least 1 per cent water was added. Warrants were procured upon my affidavit, and the cases were settled by the factory, which means that the guilty parties were

made to pay the estimated damage in money to the management of the factory. In some instances this means a considerable amount, for instance, in one case the fine was \$150.

Sample No. 2952 was received from Geo. W. Price on December 2, 1891, and contained water, 98.30 per cent; solids, 10.70 per cent; fat, 3.23 per cent; curd, 6.93 per cent; salts, .55 per cent. At least 10 per cent of water was added. Certificate was made out and sworn to and forwarded to the assistant commissioner of the division from which it came.

Sample No. 2953 was received from Geo. W. Price on December 3, 1891, and contained water, 88.88 per cent; solids, 11.12 per cent; fat, 3.59 per cent; curd, 6.96 per cent; salts, .57 per cent. At least 7 per cent of water was added. Certificate was made out and sworn to December 7, 1891, and forwarded to the assistant commissioner of the division from which it came.

Sample No. 3447 was received from Charles Burke and George B. Fellows on February 17, 1892, and contained water, 88.09 per cent; solids, 10.91 per cent; fat, 3.36 per cent; curd, 7.04 per cent; salts, .51 per cent. There was at least 9 per cent of water added. Certificate was sworn to and sent to the capitol, February 26, 1892. Appeared in police court March 9th, 12th and 21st, 1892.

Sample No. 3448 was received from Charles Burke and George B. Fellows on February 18, 1892, and contained water, 88.33 per cent; solids, 11.67 per cent; fat, 4.06 per cent; curd, 7.06 per cent; salts, .55 per cent; water added, 2 per cent at least. Certificate sworn to and delivered to Assistant Commissioner George L. Flanders, at the capitol, February 26, 1892. Appeared in police court, March 9th, 12th and 21st, 1892.

Sample No. 3449 was received from Charles Burke and George B. Fellows on February 19, 1892, and contained water, 89.97 per cent; solids, 10.03 per cent; fat, 3.19 per cent; curd, 6.34 per cent; salts, .50 per cent. There was at least 16 per cent of water added. Certificate sworn to and delivered to Assistant Commissioner George L. Flanders, at the capitol, February 26, 1892. Appeared in police court, March 21st and 23d, 1892.

Sample No. 3450 was received from Charles Burke and George B. Fellows on February 23, 1892, and contained water, 88.35 per cent; solids, 10.65 per cent; fat, 2.96 per cent; curd, 7.17 per cent; salts, .52 per cent; water added, at least 11 per cent. A certificate of analysis was delivered to Assistant Commissioner George L. Flanders, at the capitol, February 26, 1892. Appeared in police court, March 21st and 23d, 1892.

Sample No. 3451 was received from Charles Burke and George B. Fellows on April 5th, 1892, and contained, water, 98.47 per cent; solids, 10.13 per cent; fat, 3.33 per cent; curd, 6.71 per cent; salts, .49 per cent. At least 12 per cent of water added. Certificate was sworn to and delivered at the capitol to Assistant Commissioner George L. Flanders, April 18, 1892. Appeared at police court, at Albany, N. Y., May 31 and June 6, 1892.

Sample No. 3452 was received from Charles Burke, April 6, 1892, and contained water, 98.12 per cent; solids, 10.48 per cent; fat, 3.05 per cent; curd, 6.89 per cent; salts, .54 per cent. There was at least 12 per cent of water added. Certificate sworn to and delivered at capitol, April 18, 1892. Appeared in police court, at Schenectady, May 13, 1892.

Sample No. 3453 was received from Charles Burke, April 6, 1892, and contained water, 89.69 per cent; solids, 10.61 per cent; fat, 2.98 per cent; curd, 7.02 per cent; salts, .61 per cent. At least 11 per cent of water added. Certificate sworn to and delivered at the capitol, April 18, 1892. Appeared in police court in Schenectady, May 13, 20, 26, 1892, when a jury trial was held. In this case the health officer of the city of Schenectady, and another physician practicing in that city, testified that they had analyzed one of the samples (not this one) taken at Schenectady, which I had pronounced adulterated, and found it up to the standard required by law, which gave the preponderance of evidence against me, which made it necessary for us to call in, as an expert, Professor Perkins of Union University. After hearing a description of the methods employed by the health officer and physician, and, also, the one employed by myself, Professor Perkins testified that their method was unreliable; after a long and tedious trial, the jury rendered a verdict of guilty, and a fine of twenty-five dollars was imposed.

Sample No. 3454 was received from Charles Burke on April 6, 1892, and contained water, 89.64 per cent; solids, 10.36 per cent; fat, 3.08 per cent; curd, 6.81 per cent; salts, .47 per cent. At least 13 per cent of water was added.

Sample No. 3455 was received from Charles Burke on the same day and contained water, 89.44 per cent; solids, 10.56 per cent; fat, 3.33 per cent; curd, 6.67 per cent; salts, .56 per cent. There was at least 12 per cent of water added. In these two cases — Nos. 3454 and 3455 — certificates were sworn to and delivered at the capitol on April 16, 1892. Appeared in police court at Schenectady, May 4, 1892, when both parties waived examination and gave bail to appear before the grand jury, September 16, 1892, to give our testimony, we discovered that one of the offenders was a member of the grand jury; there was no bill found.

Samples Nos. 3456 and 3458, were received from Charles Burke, June 1, 1892. No. 3456 contained water, 92.86 per cent; solids, 7.14 per cent; fat, 1.98 per cent; curd, 4.77 per cent; salts, .39 per cent. At least 40 per cent of water was added. No. 3458 contained water, 92.82 per cent; solids, 7.18 per cent; fat, 1.93 per cent; curd, 4.87 per cent; salts, .393 per cent. At least 40 per cent of water was added. Certificates of these two analyses were sworn to and delivered at the capitol, June 21, 1892. In the case No. 3456 appeared in police court at Albany, June 29, and July 11, 1892.

Samples Nos. 3459 and 3460 were received from Geo. B. Fellows, June 8, 1892. No. 3459 contained water, 89.15 per cent; solids, 10.85 per cent; fat, 2.93 per cent; curd, 7.35 per cent; salts, .57 per cent. At least 9 per cent of water was added. No. 3460 contained water, 98.11 per cent; solids, 10.89 per cent; fat, 3.20 per cent; curd, 7.14 per cent; salts, .55 per cent. At least 9 per cent of water was added. Certificate delivered at the capitol, June 21, 1892. Appeared in recorder's court in case of sample No. 3459, July 1, 2, 4 and 7, 1892; in case of No. 3460, July 1 and 2, 1892.

Sample No. 3457 was received from Geo. B. Fellows, June 13, 1892, and contained water, 89.20 per cent; solids, 10.80 per cent; fat, 3.03 per cent; curd, 7.25 per cent; salts, .52 per cent. At least

10 per cent water added. Certificate was delivered at the capitol, June twenty-first. Appeared in police court at West Troy, July 19, 1892.

Samples Nos. 3461 and 3863 were received from Geo. B. Fellows on June 16, 1892. No. 3461 contained water, 89.66 per cent; solids, 10.34 per cent; fat, 2.99 per cent; curd, 6.81 per cent; salts, .51 per cent. At least 13 per cent of water was added. No. 3863 contained water, 88.75 per cent; solids, 11.25 per cent; fat, 3.85 per cent; curd, 3.87 per cent; salts, .53 per cent. There was at least 6 per cent water added. In case No. 3461 appeared in recorder's court at Cohoes, July first and second. In case No. 3463 appeared in same court July 1, 2, 4 and 7, 1892.

Sample No. 3864 was received from Charles Burke on June 21, 1892, and contained water, 89.71 per cent; solids, 10.29 per cent; fat, 3.02 per cent; curd, 6.74 per cent; salts, .53 per cent. At least 14 per cent water added. Certificate delivered at capitol, June 28, 1892. Appeared in police court June 30 and July 5, 1892.

Sample No. 2963 was received from G. W. Price, June 23, 1892, and contained water, 89.87 per cent; solids, 10.13 per cent; fat, 2.02 per cent; curd, 7.59 per cent; salts, .52 per cent. There was added 15 per cent of water, at least. Certificate was sworn to and sent to the assistant commissioner of the division from which it came on June 28, 1892.

Samples Nos. 3865 and 3866 were received from G. B. Fellows, June 23, 1892. No. 3865 contained water, 88.68 per cent; solids, 11.32 per cent; fat, 3.72 per cent; curd, 7.08 per cent; salts, .52 per cent. Five per cent added water, at least. No. 3866 contained water, 88.32 per cent; solids, 11.68 per cent; fat, 3.85 per cent; curd, 7.28 per cent; salts, .55 per cent. There was at least 2 per cent water added. Certificates were sworn to and delivered at the capitol, June 28, 1892. In these two cases I appeared in police court at West Troy, N. Y., July 10 and 19, 1892.

Sample No. 3868 was received from G. B. Fellows, July 15, 1892, and contained water, 90.09 per cent; solids, 9.91 per cent; fat, 3.04 per cent; curd, 6.32 per cent; salts, .55 per cent. At least 17 per cent water added. Certificate delivered at capitol, August 3, 1892. Appeared in police court at Troy on September 14 and 19, 1892.

Sample No. 3869 was received from Charles Burke, July 10, 1892, and contained water, 88.46 per cent; solids, 11.54 per cent; fat, 3.51 per cent; curd, 7.41 per cent; salts, .52 per cent. There was at least 3 per cent water added. Certificate was delivered at capitol, August 3, 1892. Appeared in police court at Albany, N. Y., August 27, September 9 and 12, 1892.

Sample No. 3870 was received from G. B. Fellows on July 22, 1892, and contained water, 89.62 per cent; solids, 10.38 per cent; fat, 2.69 per cent; curd, 7.03 per cent; salts, .66 per cent. 13 per cent water, at least, was added. Certificate was delivered at capitol, August 3, 1892. Appeared in recorder's court, at Cohoes, on August 30 and September 7, 1892. When we arrived at the court September seventh, we learned that the offender had died the day before.

On August 18, 1892, Assistant Commissioner George L. Flanders and myself took the following three samples from a cheese factory near Peru, N. Y.: Nos. 3958, 3959 and 3960. No. 3958 contained water, 89.75 per cent; solids, 10.75 per cent; fat, 3.23 per cent; curd, 6.56 per cent; salts, .46 per cent; at least 14 per cent water was added. No. 3959 contained water, 89.97 per cent; solids, 11.03 per cent; fat, 3.48 per cent; curd, 7.03 per cent; salts, .52 per cent; there was 8 per cent water added, at least. No. 3960 contained water, 89.09 per cent; solids, 10.91 per cent; fat, 3.26 per cent; curd, 7.10 per cent; salts, .55 per cent; there was, at least, 9 per cent water added. Certificates were delivered at the capitol, August 20, 1892.

In company with Assistant Commissioner George L. Flanders I went to Plattsburgh, and appeared in police court on September 2 and 3, 1892.

On August 24, 1892, in company with Simon Nussbaum, I took samples Nos. 3961 and 3962 from a cheese factory at Salem, N. Y. No. 3961 contained water, 88.35 per cent; solids, 11.65 per cent; fat, 3.91 per cent; curd, 7.20 per cent; salts, .54 per cent; at least 2 per cent water added. No. 3962 contained water, 88.46 per cent; solids, 11.52 per cent; fat, 3.49 per cent; curd, 7.40 per cent; salts, .63 per cent; at least 4 per cent water added. Appeared in Court

of Special Sessions in this case September 28, 1892, and October 3, 1892.

Sample No. 3871 was received from Schenectady from Charles Burke, September 8, 1892, and contained water, 88.40 per cent; solids, 11.60 per cent; fat, 3.77 per cent; curd, 7.33 per cent; salts, .50 per cent. There was at least 3 per cent water added. Certificate was delivered at the capitol, September 24, 1892. Appeared in police court, at Schenectady, November 25 and 28, 1892.

Sample No. 3872 was received from Charles Burke on September 12, 1892, and contained water, 88.93 per cent; solids, 11.07 per cent; fat, 2.97 per cent; curd, 7.61 per cent; salts, .53 per cent. At least 7 per cent water added. Certificate was delivered at the capitol, September twenty-fourth. Appeared in police court, at Albany, on November 25 and December 1, 1892.

Sample No. 3876 was received from G. B. Fellows and Charles Burke, September 28, 1892, and contained water, 88.31 per cent; solids, 11.69 per cent; fat, 3.85 per cent; curd, 7.34 per cent; salts, .50 per cent. Two per cent water added at least. Certificate was delivered at capitol, November 24, 1892. Appeared in police court at Albany on November 26 and December 1, 1892.

Sample No. 3874 was received from G. B. Fellows on November 10, 1892, and contained water, 89.66 per cent; solids, 10.34 per cent; fat, 3.09 per cent; curd, 6.72 per cent; salts, .53 per cent. At least 13 per cent water added. Certificate was delivered at capitol, November 24, 1892. Appeared in police court at Albany on November 26 and December 1, 1892.

Tuberculous Cows.

On October 6, 1892, in company with Dr. D. B. Comstock, veterinarian, I visited and examined the herd of dairy cows belonging to Nathan Burch, of South Brookfield, Madison county, N. Y. The herd consisted of eighteen cows.

About five years ago he found one of his cows dead in an orchard; there were no signs whatever of her being choked by an apple, or that her death was due to any external violence; she appeared to have been perfectly well before her death. About

one year later another cow began to "run down," to cough, and to diminish in her flow of milk. After a few months she was killed and her lungs were found to be filled with yellow grape like "lumps." These "lumps" also protruded from the pleura.

Two years ago, in June, another cow commenced in about the same way and continued in like manner till she was killed, and upon post mortem examination, her lungs were found to be filled with "matter." Her case differed from the one above in that she had diarrhoea.

Last spring another cow was found dead, having previously seemed perfectly well. In July last another cow was noticed to be breathing hard and coughing considerably. This cow was still living at the time of our visit and presented unequivocal signs of advanced tuberculosis. One other cow presented signs of being in the incipient stage of tuberculosis.

It was alleged, and we believe it is true, that there are other herds in that locality affected with tuberculosis. Mr. Burch was milking these cows and taking the milk to a cheese factory to be made up into cheese. Mr. Burch stated to us that he felt there was something serious the matter with his cows and that their milk might be injurious for human consumption; hence he had sent for the agents of this department to inform him of the nature of the trouble and instruct him as to what to do; that he was a poor man and could not afford to lose the milk from these cows, much less lose the cows themselves, but would not do any thing to injure anyone. Of course, we ordered the sale of the milk from the diseased cows stopped and this being the limit of our power we by your direction referred the matter to the State board of health.

Respectfully submitted,

R. D. CLARK, M. D.,
Department Chemist.

REPLIES TO CIRCULAR

SENT TO

Vinegar Manufacturers of the State in 1892.

ALBANY COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar ?		How long have you been such ?	How much do you manufacture during one season ?	Where do you get your cider or cider-vinegar stock ?
		Yes.	No.			
1	Delmar	1	.....	26 years	20 barrels.....	Vicinity.
2	Coeyman's Junction.....	1	.....	2 years	1,500 barrels	Vicinity.
3	Lisha's Kill.....	1	.....	12 years	1,500 to 2,000 gallons.....	Town of Watervliet.
4	Medusa.....	1	.....	20 years	50 to 250 barrels	Make it.
5	Union Church .....	.....	1	.....	4 to 5 barrels	Own apples.
6	Voorheesville	1	.....	27 years	1,000 barrels	Make it.
7	Guilderland Centre.....	1	.....	40 years	2,000 barrels	Make it.
8	Albany	1	.....	10 years	5,000 to 6,000 barrels.....	Make it.
9	Newtonville	1	.....	8 years	25 to 40 barrels	Make it.
10	Slingerland's	1	.....	6 years	70 to 75 barrels	Make it.
11	Berne	1	.....	.....	.....	.....
12	South Bethlehem.....	1	.....	13 years	2,000 barrels.....	Make it.
13	Alcove	1	.....	20 years	3,000 to 5,000 barrels.....	Make it.

ALBANY COUNTY — (Continued).

Circular number.	POST-OFFICE.	Where is the fruit grown from which the cider or stock you use is made?	Do you manufacture a uniform strength of vinegar as to acidity?		If uniform what is the percentage of the acidity?	If of varying strength, lowest, greatest?		Do you have any difficulty in producing in pure cider vinegar 4.5 of acidity?	
			Uniform.	Varying.		Lowest.	Greatest.	Yes.	No.
1	Delmar	Bethlehem, Albany county .....	.....	1	.....	.....	4.5	1	.....
2	Ocoyman's Junction	Albany, Greene, Ulster and other counties .....	.....	1	.....	4	4.35	1	.....
3	Lisha's Kill	Watervliet, Albany county .....	.....	1	.....	.....	4	1	.....
4	Medusa .....	.....	.....	1	.....	4	4.7	1	.....
5	Union Church .....	.....	.....	1	.....	.....	5	1	.....
6	Voorheesville .....	.....	.....	1	.....	3.5	5.25	1	.....
7	Guilderland Centre	Town of Guilderland, Albany county .....	.....	1	.....	3	5	1	.....
8	Albany	Albany, Columbia, Clinton, Delaware, Essex, Rensselaer, Greene and Ulster counties .....	.....	1	.....	3.9	5.3	1	.....
9	Newtonville	Vicinity .....	.....	1	.....	.....	.....	1	.....
10	Slingerland's	Albany county .....	.....	1	.....	.....	.....	1	.....
11	Berne .....	.....	.....	.....	.....	.....	.....	.....	.....
12	South Bethlehem	Albany county	1	.....	4.5	.....	.....	1	.....
13	Alcove	Vicinity	1	.....	.....	.....	.....	.....	.....

ALBANY COUNTY—(Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		If so, what are those conditions?		Does the time of the year in which the apples ripen have any thing to do with the amount of acetic acid they will produce?		If so, what?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	Yes.	No.	Yes.	No.	Yes.	No.	Yes.	No.
1	Delmar	1	.....	Late ripening apples contain	.....	1	.....	Early harvest apples are not worth making up; let them rot; they are deficient.	.....	1	.....
2	Coeyman's Junction	1	.....	.....	.....	.....	.....	.....	.....	1	.....
3	Lake's Kill	1	.....	Generally freezes enough to make stock 45; time of growth; generally turn first of season's fruit into vinegar stock.	.....	1	.....	The early ripened is weakest	.....	1	.....
4	Medusa	1	.....	Cider made from immature upon high t of elevation	.....	1	.....	When apples mature before cold weather sets in the percentage will be the highest.	.....	1	.....
5	Union Church	1	.....	It makes than com-	.....	1	.....	The earlier the weaker.	.....	1	.....
6	Voorheesville	1	.....	It; sections where grown; defects in fermentation and manufacture.	.....	1	.....	Early apples do not contain sugar enough to make standard vinegar; without sufficient sugar enough alcohol good.	.....	.....	.....
7	Gulderland Centre	1	.....	Cider from early fruit causes difficulty.	.....	1	.....	..... not contain to produce	.....	.....	.....
8	Albany	1	.....	Late apples make more acidity than early, Essex and Clinton counties more than Albany, Greene or Columbia.	.....	1	.....	..... less acidity than winter fruit fully ripened	.....	1	.....
9	Newtonville .....	.....	.....	.....	.....	.....	.....	..... not have to alcohol	.....	.....	.....
10	Slingerland's	1	.....	Early and poor fruit	.....	1	.....	to produce standard vinegar	.....	.....	.....
11	Berne .....	.....	.....	.....	.....	.....	.....	Late fruit is the best.	.....	.....	.....
12	South Bethlehem	1	.....	Sandy and stony land makes a difference; that from sandy land is not so strong.	.....	1	.....	Half, or possibly more.	.....	.....	.....
13	Albore .....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....

ALBANY COUNTY — (Continued).

The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been and is still being made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.

4 1/2 %.	4 %.	Remarks
1	1	Believe the standard too high; should be reduced to 4% acetic acid, when we might make from late ripened apples a vinegar without any other assistance.
2	1	Think the law should be so as to allow ordinary windfalls to be made into vinegar, as cider made before October fifteenth is useless for vinegar and a large part of the crop is wasted in September as they will not keep in hot weather; think one-eighth of the crop is wasted.
3	1	It will give the farmer a chance to sell a much better article at 4%, and it will give the farmer a chance to sell graded and the standard should be reduced percentage.
4	1	Think to it
5	1	reason that early apples, which are almost useless for vinegar, are mixed with later ones, which is a loss to apple grower and cider maker also.
6	1	We are in favor of 4% acetic acid for the following reasons, viz.: costs less to make; 4% is strong enough for all use; high standard makes a monopoly for a few; a account of late start in making vinegar; opportunity to cider; unfairness of standard.
7	1	should be 4%, which is strong enough for table use or pickles, and gives satisfaction, I have sold hundreds of barrels which was 3.5%, and it gave entire satisfaction to customers.
8	1	Have been in favor of reducing the standard, but am not at present; we can make 4 1/2% and make more money than by a lower standard; if the standard was lowered a great many who cannot make 4.5% vinegar would put it upon the market at lower prices than is maintained by the larger firms, which would not be to our interest.

							percentage
9	Newtonville .....	.....	.....	.....	.....	1	
10	Slingsford's .....	.....	.....	.....	.....	1	4%; I make on account
11	Berne .....	.....	.....	.....	.....	1	expect to make is into vinegar; from what experience I have had I am in favor of 4% acetic acid.
12	South Bethlehem .....	.....	.....	.....	.....		Do not feel capable of answering all the questions as I have no means of testing my vinegar; make by natural process; am not a competent judge as to what the market requires.
13	Alcove .....	.....	.....	.....	.....

ALLEGANY COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar ?		How long have you been such ?	How much do you manufacture during one season ?	Where do you get your cider or cider-vinegar stock ?
		Yes.	No.			
1	Cuba .....	.....	1	.....	.....	.....
2	Short Tract .....	.....	1	5 years	800 to 500 barrels	From apples.
3	Alfred Station	1	.....	25 years	20 to 25 barrels	Make it.
4	Wischoy	1	.....	6 years	5 to 20 casks	Make it.
5	Almond .....	.....	1	.....	.....	.....
6	Belmont	1	.....	12 years	100 barrels	Make it.
7	Scio .....	.....	1	.....	.....	.....
8	Nile	1	.....	25 years	200 to 300 barrels	Make it.

ALLEGANY COUNTY — (Continued).

Circular number.	POST-OFFICE.	Where is the fruit grown from which the cider or stock you use is made?	Do you manufacture a uniform or a varying strength of vinegar as to acidity?		If uniform what is the percentage of the acidity?	If of a varying strength, what is the lowest and greatest percentage of acidity that you manufacture?		Do you have any difficulty in producing in pure cider vinegar 4.5% of acidity?	
			Uniform.	Varying.		Lowest.	Greatest.	Yes.	No.
1	Cuba .....	.....	.....	.....	.....	.....	.....	1	.....
2	Short Tract	Northern part Allegany county.	....	1	.....	.....	4.5	.....	.....
3	Alfred Station	Vicinity .....	.....	1	..	.....	.....	.....	.....
4	Wiscony	Vicinity .....	.....	1	.....	.....	.....	.....	.....
5	Almond .....	.....	.....	.....	.....	.....	.....	.....	.....
6	Belmont	Amity and vicinity .....	.....	1	.....	4.5	.....	.....	1
7	Scio .....	.....	.....	.....	.....	.....	.....	.....	.....
8	Nile	Vicinity	1	.....	.....	.....	.....	.....	1

ALLEGANY COUNTY -- (Continued).

Circular number	POST-OFFICE	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes	No	Yes	No	Yes	No
1	Cuba.....	.....	.....	1	.....	.....	.....
2	Short Tract.....	1	.....	1	.....	.....	.....
3	Alfred Station.....	.....	.....	1	.....	.....	.....
4	Wiscoy.....	.....	.....	1	.....	.....	.....
5	Almond.....	.....	.....	.....	.....	.....	.....
6	Belmont.....	.....	.....	.....	.....	.....	.....
7	Edo.....	.....	.....	.....	.....	.....	.....
8	Nile.....	.....	.....	1	.....	.....	.....

ALLEGANY COUNTY — (Concluded).

Circular number.	POST-OFFICE.	acid ?		If so, where ?	Qts.	4s.	Remarks.
		Yes.	No.				
1	Cuba.....	1	1	Think it would be better, as it is very hard to bring it up to the standard as it now is; I had to stop making vinegar, and I now sell my cider as acet, or when it is just turned a little. Where cider is made for vinegar early fruit is the best. It ripens when the weather is warm, contains more sugar and, therefore, better vinegar; late fruit costs too much; all the cider of a season mixed together will make a vinegar of 4.5% acetic acid.
2	Short Tract.....	.....	.....	There are some varieties of natural or un-grafted fruit that will not, if used alone, produce a vinegar that will make over 3.5% of acid.	1	.....
3	Alfred Station.....	.....	.....	.....	.....	.....
4	Wincoy.....	.....	.....	.....	1	.....
5	Almond.....	.....	.....	.....	.....	1
6	Belmont.....	.....	.....	.....	30	.....
7	Solo.....	.....	.....	.....	.....	1
8	Nile.....	1	.....	.....	1	.....

The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been and is still being made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.

BROOME COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar ?		How long have you been such ?	How much do you manufacture during one season ?	Where do you get your cider or cider-vinegar stock ?
		Yes.	No.			
1	Glen Castle.....	1	.....	18 or 10 years.....	50 to 400 gallons.....	Make it.
2	Nineveh.....	1	.....	22 years.....	.....	Make it.
3	Oquaga.....	1	.....	6 years.....	1,500 barrels.....	Make it.
4	Vestal Center.....	1	.....	Some time.....	What we have.....	One year ago we bought us a cider mill of the improved style, and used it.
5	Binghamton.....	1	.....	15 years.....	10 to 50 casks.....	Vicinity of Binghamton.
6	Binghamton.....	1	.....	20 years.....	10 to 20 barrels.....	Make it.
7	Union.....	1	.....	30 years.....	10 to 40 barrels.....	Make it.
8	Edison.....	1	.....	1 year.....	.....	Make it.

BROOME COUNTY — (Continued).

[illegible]

BROOME COUNTY — (Concluded).

Circular number.	POST-OFFICE.	1 containing 4.5 per cent of acetic acid?			The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been and is still being made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.	Remarks.	
		Yes.	No.	If so, where?		4½%	4%.
1	Glen Castle.....	....	....	....	....	1	Think the standard should be made an even four per cent.
2	Nineveh.....	....	....	....	....	....	.....
3	Oquaga.....	....	....	....	....	....	I do not really understand what you mean; it does not make much difference what

CATTARAUGUS COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manufacture during one season?	Where do you get your cider or cider-vinegar stock?
		Yes.	No.			
1	Otto .....	.....		Not now .....	.....	Make it.
2	Gowanda.....	1	.....	32 years	50 to 150 barrels	Make it.
3	Red House	1	.....	30 years	1 barrel.....	Make it.
4	Napoli.....	1	.....	6 years	50 barrels.....	Make it.
5	Markham's	1	.....	10 years	900 gallons.....	.....
6	Red House	1	.....	6 years	2 to 5 barrels	Make it.

CATTARAUGUS COUNTY -- (Continued).

Circular number.	POST-OFFICE.	Where is the fruit grown from which the cider or stock you use is made?	Do you manufacture a uniform or a varying strength of vinegar as to acidity?		If uniform what is the percentage of the acidity?	If of a varying strength, what is the lowest and greatest percentage of acidity that you manufacture?		Do you have any difficulty in producing in pure cider vinegar 4.5% of acidity?	
			Uniform.	Varying.		Lowest.	Greatest.	Yes.	No.
1	Otto	Cattaraugus county .....	.....	.....	.....	.....	.....	.....	.....
2	Gowanda	Towns of Dayton, Otto, Persia and Perrysburgh.	.....	.....	.....	.....	.....	1	.....
3	Red House	Vicinity .....	.....	.....	.....	.....	.....	.....	.....
4	Napoli	Vicinity .....	.....	1	.....	4.5	.....	.....	.....
5	Markham's .....	.....	.....	.....	.....	.....	.....	.....	.....
6	Red House	Town of Red House	1	.....	4.5	.....	.....	.....	1

CATTARAUGUS COUNTY — (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	If so, what are those conditions?	Yes.	No.	If so, how?
1	Otto	1	.....	.....	1	.....	.....
	Gowanda			Some apples are too poor to produce vinegar.			Early fruit will make vinegar that will not last six months.
3	Red House.....			.....			.....
4	Napoli .....			.....			.....

5	Markham's .....			.....			.....
6	Red House.....			.....	1	.....	.....

CATTARAUGUS COUNTY — (Concluded).

Circular number.	POST-OFFICE.	acid ?			Remarks.
		Yes.	No.	If so, where ?	
1	Otto .....	....	1	Think not.....	Think the law all right as it now stands.
2	Gowanda .....	....	....	....	....
3	Red House .....	....	....	....	....
4	Napoli.....	....	....	....	I have Mott's acetometer, and the soda scale; have had it go made with straw and wooden
5	Markham's .....	....	....	....	I
6	Red House .....	....	1	....	I

The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been and is still being made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.

CAYUGA COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manufacture during one season?	Where do you get your cider or cider-vinegar stock?
		Yes.	No.			
1	Cayuga.....	1	.....	20 years	25 barrels	Make it.
2	Fosterville	1	.....	30 years	From 2 to 40 40-gallon casks; depends on price of apples; sell at 20 cents per bushel.	Our vinegar stock has been in our family for over 40 years.
3	Meridian	1	.....	10 years	20 to 30 casks.....	Make it.
4	Moravia	1	.....	10 years	Few barrels, and retail at home.	Make it.
5	New Hope.....	.....	.....	.....	.....	Make it.
6	Port Byron.....	1	.....	2 years .....	.....	Make it.
7	Sterling	1	.....	25 years	30 to 150 barrels	Make it.
8	Port Byron.....	1	.....	1 year	6,000 or 7,000 gallons.....	Make it.
9	Victory.....	1	.....	5 years	8 or 4 barrels	Make it.
10	Weedsport	1	.....	8 years	20 to 100 barrels	Make it.
11	Auburn	1	.....	6 years	300 barrels	Make it.
12	DeGroff	1	.....	7 years	100 barrels	Towns of Owasco and Niles.
13	Five Corners	1	.....	8 years	740 to 50 barrels	Make it.
14	Owasco	1	.....	6 years	10 to 25 barrels	Make it.
15	Port Byron.....	1	.....	4 years	1,500 gallons.....	Make it.

CAYUGA COUNTY — (Continued).

Circular number.	POST-OFFICE.	Where is the fruit grown from which the cider or stock you use is made?	Do you manufacture or a varying strength of vinegar as to acidity?		If uniform what is the percentage of the acidity?	If of a varying strength, acidity that you manufacture?		Do you have any difficulty in producing in pure cider vinegar 4.5% of acidity?	
			Uniform.	Varying.		Lowest.	Greatest.	Yes.	No.
1	Cayuga.....	Within two miles radius; buy apples and make refined	.....	1	.....	.....	.....	.....	1
2	Fosterville.....		1	.....	.....	.....	.....	.....	1
3	Meridian.....		1	.....	.....	.....	.....	.....	1
4	Moravia.....		.....	.....	.....	.....	.....	.....	.....
5	New Hope.....		.....	.....	.....	.....	.....	.....	.....
6	Port Byron.....		.....	.....	.....	.....	.....	.....	.....
7	Sterling.....		.....	.....	.....	.....	.....	.....	.....
8	Port Byron.....		.....	.....	.....	.....	.....	.....	.....
9	Victory.....	st. by	.....	1	.....	.....	.....	.....	.....
10	Weedsport.....		.....	1	.....	.....	4.5	1	.....
11	Auburn.....		1	.....	4.5	.....	.....	1	.....
12	DeGroff.....		.....	1	.....	.....	.....	.....	.....
13	Five Corners.....	les	.....	.....	.....	.....	.....	.....	.....
14	Owasco.....	st.	1	.....	.....	.....	.....	.....	.....
15	Port Byron.....		.....	1	.....	.....	.....	.....	.....

CAYUGA COUNTY — (Continued).

Circular number 1

2	Posterville.	Varieties and seasons might have an influence on the quality of the cider produced.	1	Best cider is produced from well-ripened apples (late fall or early winter); early, immature, partially decayed or worm-eaten apples would produce an insipid cider, incapable of producing much acidity.	1	The cause of the difference may be from a different kind of soil, elevation, cultivation of trees and other causes.
3	Meridian.	1	is time some- -----	1	Think not.
4	Moravia.	1	Good winter fruit makes the best cider or vinegar.
5	New Hope.
6	Port Byron.	I have no trouble in producing first-class vinegar from good cider.
7	Sterling.	1	I have found it, under all kinds and conditions of circumstances.	1	Late cider has more body and forms a stronger acid but is slower in forming.	Am unable to say, as I have never used any but local fruit.
8	Port Byron.
9	Victory.	1	Am sure it does not contain 4.25 of acetic acid.	1	Cider made early, say September, will make vinegar the quickest and will be the strongest.	1	I don't think they will.
10	Weedsport.	1	In some cases I do; am not sure as regards this.	1	Early apples will not produce as much as late.

11	Auburn.	1	.....	I think it is owing to condition of the fruit; immature fruit lacks sugar.	1	.....	Apples should be well-ripened and of good quality.	.....	.....
12	DeGroff .....	.....	.....	.....	.....	.....	.....	.....	.....
13	Five Corners.....	.....	.....	.....	• 1	.....	Late, ripe apples make the best product.	.....	.....
14	Owasco.....	.....	.....	.....	1	.....	Apples ripening on the trees make the best vinegar.	1	..... It is owing to the soil and the way the trees are taken care of.
15	Port Byron .....	.....	.....	.....	1	.....	.....	.....	.....

CAYUGA COUNTY — (Concluded).

Circular number.	POST-OFFICE.	QUESTIONS.			Yrs.	Remarks.
		Yes.	No.	If so, where?		
1	Cayuga.....	.....	.....	.....	1	we do doubt a dealers; I think at our mills in unadulterated
2	Foster ville .....	.....	.....	in some localities the	1	
3	Meridian .....	.....	1	.....	1	bushel of apples, in different mills. Not to my knowledge ..
4	Moravia .....	.....	.....	.....	.....
5	New Hope.....	.....	.....	.....	1	.....
6	Port Byron .....	.....	.....	.....	.....
7	Starling .....	.....	.....	.....	.....	.....
8	Port Byron.....	.....	.....	.....	1	

favor of slop vinegar, such as our markets are flooded with, and not for any benefit to manufacturers of good, straight older vinegar.

9	Victory.....	.....	.....	.....	.....	.....	1	T	mill, will produce vinegar with 4.5% acetic acid with vinegar stock is taken from mills making cider for after the cider has been extracted the pomace is d and the resultant sold for vinegar stock; do not r; am in favor of reducing to 4% acetic acid; at that h; three-quarters of the vinegar r-tailed here is of
10	Weedport.....	.....	.....	.....	.....	.....	1	I think that 4% vinegar is as strong as should be taken into the stomach; it would if to handle his stock to better advantage and would be just t.	
11	Auburn.....	.....	.....	.....	.....	.....	1	I standard, as at that strength all consumers and dealers are satisfied	ners; many reduce it for t.
12	Deford.....	.....	.....	.....	.....	.....	1	Cider vinegar, at 4%, gives th ink a	is necessary to use acids
13	Five Corners.....	.....	.....	.....	.....	.....	1	ink	small dealers who cannot
14	Owano.....	.....	.....	.....	.....	.....	1	ed instead of lowered; there would not be so much difficulty for a pure article; there is too much stuff they call vinegar	
15	Port Byron.....	.....	.....	.....	.....	.....	1	g the standard to 4%; make vinegar from second pressing; r testing.	

CHAUTAUQUA COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manufacture during one season?	Where do you get your cider or cider-vinegar stock?
		Yes.	No.			
1	Brocton	1	.....	30 years	1 to 10 barrels	Make it.
2	Brocton .....	.....	1	.....	.....	Few apples are grown in town; just enough for use and vinegar purposes.
3	Clymer	1	.....	8 years	50 barrels	Make it.
4	DeWittville	1	.....	1 year	Small quantity	Make it.
5	Ellington .....	.....	1	.....	.....	In this section.
6	Forestville	1	.....	15 or 20 years	500 to 1,000 barrels	Make it.
7	Fredonia	1	.....	30 years	Have made 100 barrels	Make it.
8	Fredonia	1	.....	4 years	150 barrels	Make it.
9	Hartfield	1	.....	12 or 15 years	300 to 500 barrels	Of the farmers.
10	Nashville	1	.....	30 years	100 to 500 barrels	Make it
11	Stclairville	1	.....	6 years	1 to 300 barrels	Chautauqua county.
12	Bemus Point	1	.....	12 years	1 to 10 barrels	Make it.
13	Clymer	1	.....	5 years	1 barrel	Make it.
14	Jamestown	1	.....	5 years	100 barrels	Make it.
15	Portland .....	.....	1	.....	.....	.....
16	Westfield .....	.....	1	.....	.....	Make it.
17	Westfield .....	.....	1	.....	.....	.....
18	Smith's Mills	1	.....	10 years	500 to 800 barrels	Make it.

CHAUTAUQUA COUNTY — (Continued).

(Bouler number.)	POST-OFFICE.	Where is the fruit grown from which the cider or stock you use is made?	Do you manufacture a uniform strength of vinegar as to acidity?		If uniform what is the percentage of the acidity?	If of a varying strength, what is the lowest and greatest acidity that you manufacture?		Do you have any difficulty in producing in pure cider vinegar 4% of acidity?	
			Uniform.	Varying.		Lowest.	Greatest.	Yes.	No.
1	Brocton .....	..... gravel.	1	.....	.....	.....	.....	.....	1
2	Brocton .....	.....	.....	.....	.....	.....	.....	.....	.....
3	Clymer.....	In Western New York and edge of Pennsylvania.....	.....	1	.....	.....	.....	.....	.....
4	De Wittville	Chautauqua county.....	.....	1	.....	4	4.5	1	.....
5	Ellington	Town of Hanover.....	.....	.....	4.5	.....	.....	.....	.....
6	Forestville	Fredonia	1	.....	.....	3.5	4.5	.....	1
7	Fredonia	Vicinity .....	.....	.....	4.5	.....	.....	.....	.....
8	Fredonia	Town of Chautauqua.....	1	.....	.....	4	5	.....	1
9	Hartfield	Town of Perryburgh, Cattaraugus county.....	1	.....	.....	.....	.....	.....	.....
10	Nashville	Chautauqua county, and, sometimes, eastern counties, when apples are not plenty here.....	.....	1	.....	.....	4	1	.....
11	Sinclairville	Town of Ellery, Chautauqua county.....	.....	1	.....	4.5	4.5	.....	1
12	Benus Point	Vicinity .....	.....	.....	.....	4	.....	.....	.....
13	Clymer	Chautauqua county.....	.....	1	.....	.....	5.5	.....	.....
14	Jamesstown.....	Chautauqua county.....	.....	.....	.....	.....	.....	.....	.....
15	Portland	Chautauqua county.....	.....	.....	.....	.....	.....	.....	.....
16	Westfield.....	Chautauqua county.....	1	.....	.....	.....	.....	.....	1
17	Westfield.....	Vicinity .....	.....	.....	.....	.....	.....	.....	.....
18	Smith's Mills.....	.....	1	.....	.....	.....	.....	.....	1

10	Nashville	1	I think, perhaps, it is; do not have as many winter apples.	1	Early apples will not make as strong vinegar.	1	in the varieties.
11	Shickelville				The later the fruit the more acid it contains.		
12	Barnus Point						
13	Clymer						
14	Jamesstown						
15	Portland						
16	Westfield				The later in the season the more acid the fruit contains.	1	There is a difference in fruit in different soils.
17	Westfield						
18	Smith's Mills	1	There is no difficulty with good, ripe, sound fruit.	1	Early apples do not have the acidity that fruit grown and ripening later in the season has.	1	aking good ack is clean- sound, late

CHAUTAQUA COUNTY -- (Concluded).

Circular number.	POST-OFFICE.	I.			4½%.	4%.	Remarks.
		Yes.	No.	If so, where?			
1	Brocton .....	.....	.....	.....	.....	.....	What little vinegar keep in cellar from Oct. 1 to Nov. 1 for vinegar In November; home trade vinegar \$1.00 for vinegar Vinegar in one year; must keep it till it is slow and hard to get; if I had could favor 4.5%, but as it is, say 4% is engaged in it; have a good article or alteration. al too strong for family use; in my ones vinegar ought to be put out of
2	Brocton .....	.....	1	Think not	1	.....
3	Clymer .....	.....	.....	.....	.....	1	
4	DeWittville .....	.....	.....	.....	.....	1	
5	Ellington .....	.....	.....	.....	1	.....	the market. Am decidedly in favor of reducing now I cannot use them; can use 4 Before the standard was raised to September twentieth, and could about October fifteenth, when re- than vinegar; I cannot compete 1 cents more per gallon than I could for vinegar; we cannot use early apples or windfalls unless the standard is put at 4%; that is strong enough for any use and it would put money in farmers' pockets. A mill like mine, who has to commence taking apples as soon as farmers begin to sell windfalls and early fruit, cannot get 4.5% out of such apples and compete with fruit, and can therefore make a higher do think that many of the large manu- is standard to be reduced to 4%.
6	Forestville	1	.....	I think in some of the Eastern States.	.....	.....
7	Fredonia	1	.....	On river bottoms	1	.....
8	Fredonia .....	.....	.....	.....	.....	1	
9	Hartfield	1	.....	I cannot make it from fall apples or early windfall apples.	.....	1	This standard should be kept up to 7-08. Think a reduction from 4.5% to 4% would benefit the producer at the cost to the consumer.
10	Nashville .....	.....	.....	.....	.....	1	
11	Stclairville	1	.....	Do not think one in ten can manufacture 4 1/2% honestly.	.....	.....
12	Berens Point .....	.....	.....	.....	1	.....
13	Clymer .....	.....	.....	.....	.....	.....
14	Jamestown .....	.....	.....	.....	.....	.....

CHEMUNG COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manu- facture during one season?	Where do you get your c'der or cider-vin- gar stock?
		Yes.	No.			
1	Swartwood	1	.....	18 years	From 8 to 10 barrels.....	Vicinity.
2	Elmira	1	.....	40 years .....	.....	Make it.
3	Chemung	1	.....	30 years	6 to 8 casks.....	Make it.
4	Van Etten .....	.....	1	.....	.....	.....

CHEMUNG COUNTY — (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes	No.	If so, what are those conditions?	Yes.	No.	If so, how?
1	Swartwood .....	....	1	Think wet not h very round	1	....	hill land takes considerable amount of apples more for a barrel of cider from same kind of fruit.
2	Elmira.....	....	....	....	....	....	....
3	Chemung	1	....	....	1	....	The soil gives flavor and acidity to the apple; those grown on clay soil are more acid than on sandy loam.
4	Van Etten .....	....	....	....	....	....	....

CHEMUNG COUNTY -- (Concluded).

Circular number.	POST-OFFICE.	Is there in this fruit or containing 4.5 per cent of acetic acid?		If so, where?		4½%.	4%.	Remarks.
		Yes.	No.					
1	Swartwood.....	1	.....	I presume there is in very wet, low land.	.....	1	.....	..... the law should be very strict prohibiting cheap. food- to be stopped at once; have known such vinegar used short time, would become tasteless, which must be
2	Elmhurst.....	.....	.....	.....	.....	.....	.....	.....
3	Chemung.....	.....	.....	.....	.....	.....	1	The general opinion of people is that the standard should be reduced, which is also my own; most people that sell vinegar like myself, do not know the strength nor how to test it.
4	Van Etten.....	.....	.....	.....	.....	1	.....	ago; think most of the vinegar manufactured from acids and is scarce, is very injurious to health and should be thoroughly

CHENANGO COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manufacture during one season?	Where do you get your cider or cider-vinegar stock?
		Yes.	No.			
1	Afton.....	1	.....	6 years	10 to 20 casks.....	.....
2	Greene	1	.....	15 years	10 to 50 barrels	Make it.
3	Haynes.....	1	.....	2½ years	50 barrels	Make it.
4	Otselic Center.....	1	.....	13 years	10 to 20 barrels	Make it.
5	Page Brook	1	.....	4 years .....	.....	Make it.
6	Sherburne	1	.....	20 years	5 to 20 barrels	Make it.
7	Afton.....	1	.....	6 years	25 barrels.....	Make it.
8	Gulford.....	.....	1	.....	.....	.....
9	Panama	1	.....	.....	.....	.....

CHERNANGO COUNTY — (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		If so, what?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	Yes.	No.	Yes.	No.	Yes.	No.
1	Afton.....	.....	.....	.....	.....	.....	.....	.....	.....
2	Greene.....	.....	.....	.....	.....	.....	.....	.....	.....
3	Haynes.....	1	.....	.....	.....	.....	.....	.....	.....
4	Oswego Center.....	.....	.....	.....	1	.....	.....	.....	.....
5	Page Brook.....	.....	.....	.....	1	.....	.....	.....	.....
6	Sherburne.....	.....	.....	.....	1	.....	.....	.....	.....
7	Afton.....	.....	.....	.....	.....	.....	.....	.....	.....
8	Gulfport.....	.....	.....	.....	.....	.....	.....	.....	.....
9	Panama.....	.....	.....	.....	.....	.....	.....	.....	.....

Probably not more than the orchards in any locality, which is often noticeable; some orchards of natural fruit have scarcely a sweet apple, while others not may be half sweet.

CHENANGO COUNTY — (Concluded).

Circular number.	POST-OFFICE.	Is there any apple-growing section in this State where the ripened fruit will not produce a vinegar containing 4.5 per cent of acetic acid?			The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been and is still being made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.			Remarks.
		Yes.	No.	If so, where?	4½%	4%		
1	Afton	This is all I can tell y. u. as I only make a small amount and have no way in testing;	
2	Greene .....	.....	.....	Do not think there is....	1	.....	
3	Haynes.....	.....	1	Do not know of any....	.....	1
4	Otselic Centre.....	.....	1	Do not know of any; it must be the makers using too much water.	1	.....	
5	Page Brook		
6	Sherburne.....	.....	.....	I think not if the August and September product is rejected.	1	.....	
7	Afton.....	.....	.....	.....	.....	1
8	Gulford.....	1		
9	Panama .....	.....	.....	.....	.....	.....

CLINTON COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar ?		How long have you been such ?	How much do you manu- facture during one season ?	Where do you get your cider or cider-vinegar stock ?
		Yes.	No.			
1	Frontier	1	.....	6 years	8 barrels.....	Make it.
2	Lapham	1	.....	3 years	200 barrels, custom work....	Make it.
3	West Chazy	1	.....	2 years	5,000 to 8,000 gallons.....	.....
4	East Beekmantown	1	.....	.....	.....	.....
5	Moore's Forks	1	.....	5 years	10 to 70 barrels	Make it.
6	Peru.....	1	.....	12 years	3 to 20 casks.....	Make it.

CLINTON COUNTY — (Continued).

Circular number	POST-OFFICE.	Where is the fruit grown from which the cider or stock you use is made?	Do you manufacture a uniform or a varying strength of vinegar as to acidity?		If uniform what is the percentage of the acidity?	If of a varying strength, what is the lowest and greatest acidity that you manufacture?		Do you have any difficulty in producing in pure cider vinegar 4.5% of acidity?	
			Uniform.	Varying.		Lowest.	Greatest.	Yes	No.
1	Frontier	On my farm.....	1	.....	4.5	.....	.....	.....	1
2	Lapbam	Vicinity	1	.....	.....	.....	.....	.....	.....
3	West Chazy	Clinton county .....	.....	1	.....	.....	.....	.....	.....
4	East Beekmantown .....	.....	.....	.....	.....	.....	.....	.....	.....
5	Moore's Forks	In the northeast corner of the State.....	1	.....	4.5	.....	.....	.....	1
6	Peru.....	On our farms .....	.....	1	.....	.....	.....	1	.....

CLINTON COUNTY — (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	Yes.	No.	Yes.	No.
1	Frontier .....	.....	1	1	.....	.....	.....
2	Lapham .....	.....	.....	.....	.....	.....	.....
3	West Chazy .....	.....	.....	.....	.....	.....	.....
4	East Beekmantown .....	.....	.....	.....	.....	.....	.....
5	Moovers Forks .....	.....	.....	.....	1	.....	.....
6	Peru	1	.....	.....	.....	.....	.....

CLINTON COUNTY — (Concluded).

Circular number.	POST-OFFICE.	Is there any apple-growing section in this State where the ripened fruit will not produce a vinegar containing 4.5 per cent of acetic acid?		If so, where?	The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.		Remarks.
		Yes.	No.		4½%.	4%	
1	Frontier .....	.....	.....	.....	1	.....	I make cider from mixed apples; keep the cider in the cellar one year; then put two gallons maple syrup to one barrel cider (fifty gallons); then let it stand one year in the cellar.
2	Lapham .....	.....	.....	.....	.....	.....	I never have tested my vinegar; make cider for customers, and if I have any left let it work into vinegar.
3	West Chazy .....	.....	.....	.....	.....	1	From what I run a vinegar I do in the winter.
4	East Beckmantown .....	.....	.....	.....	.....	.....	at the standard, I think it should be reduced. I sell my cider to some vinegar company; what vine- of letting it lay out in the summer, and in the cellar
5	Moorea Forks .....	.....	.....	.....	1	.....	made from ripe fruit, and given age
6	Peru .....	.....	.....	.....	.....	.....	he price has not improved under it, and fruit vinegar, the principal competitor,

COLUMBIA COUNTY.

Circular number.	POST-OFFICE	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manufacture during one season?	Where do you get your cider or cider-vinegar stock?
		Yes.	No.			
1	Claverack	1	.....	16 years	10 barrels.....	Claverack and Greenport.
2	Lebanon Springs.....	1	.....	23 years	1,000 to 6,000 barrels.....	Make it.
3	North Chatham	1	.....	5 years	Enough for retail home trade.	Make it.
4	Columbiaville .....	.....	1	.....	.....	.....
5	Columbiaville	1	.....	20 years	100 barrels.....	Make it.
6	West Lebanon	1	.....	10 years	10 to 15 casks	Make it.
7	Stottville	1	.....	15 years	1,000 gallons.....	Make it.
8	Coxsacke Station.....	1	.....	10 years	1 to 2 barrels	Make it.
9	Flat Brook	1	.....	25 years	100 to 500 gallons	Make it.
10	Old Chatham.....	1	.....	12 years	25 barrels.....	Make it.
11	Stuyvesant	1	.....	25 years	30 to 50 barrels	Make it.
12	Stuyvesant .....	.....	1	.....	.....	.....

COLUMBIA COUNTY — (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	Yes.	No.	Yes.	No.
1	Claverack .....	....	....	1	....	....	....
2	Lebanon Springs	1	....	1	....	1	....
3	North Chatham .....	....	....	....	....	1	....
4	Columbiaville .....	....	1	1	....	....	1
5	Columbiaville .....	....	....	....	....	....	....
6	West Lebanon	1	....	1	....	....	....
7	Stottville .....	....	1	1	....	....	....
8	Coxsackle Station .....	....	....	....	....	....	....
9	Flat Brook .....	....	....	....	....	....	....
10	Old Chatham	1	....	1	....	1	....
11	Stuyvesant .....	....	1	1	....	....	1
12	Stuyvesant .....	....	....	....	....	....	....

COLUMBIA COUNTY — (Continued).

Circular number.	POST-OFFICE.	Is there any apple-growing section in this State where the ripened fruit will not produce a vinegar containing 4.5 per cent of acetic acid?		If so, where?	The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been and is still being made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.		Remarks.
		Yes.	No.		4½%.	4%.	
1	Claverack .....	....	....	....	....	1	Think that 4% is strong enough, and it should be reduced to one and one-half per cent, and fruit growers would exert a strong influence which would exert a strong influence. I have learned by experience that a
2	Lebanon Springs	1	....	From the best information I have obtained I think there is, excepting what is made about November first. I cannot say definitely, as I cannot recall the exact locality.	....	1	
3	North Chatham .....	....	....	....	1	....
4	Columbiaville .....	....	1	Never heard of any	1	....
5	Columbiaville .....	....	....	....	....	....
6	West Lebanon .....	....	....	....	....	1	
7	Stottville .....	....	....	....	1	....
8	Cornacker Station .....	....	....	....	....	....
9	Flat Brook .....	....	....	....	1	....
10	Old Chatham .....	....	1	Think not .....	....	1	

COLUMBIA COUNTY -- (Concluded).

Circular number.	POST-OFFICE.	Is there in this fruit will not produce a vinegar containing 4.5 per cent of acetic acid?		If so, where?	The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been and is still being made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.		Remarks.
		Yes.	No.		4 1/2 %	4 %	
11	Stuyvesant	1	....	I have found apples grown soils of richness hence strength	1	....	The present law is all that is necessary for the manufacture of good, fair vinegar, but a great many cider men want that standard lowered so that they can use more water and increase their profits.
12	Stuyvesant .....	....	....	....	....	1	We think 4% strong enough; we are not manufacturers of vinegar; we sell our product as vinegar stock.

CORTLAND COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar ?		How long have you been such ?	How much do you manufacture during one season ?	Where do you get your cider or cider-vinegar stock ?
		Yes.	No.			
1	Cortland	1	.....	30 years	From none to 700 barrels...	Make it.
2	East Freetown	1	.....	5 years	25 to 30 barrels	Make it.
3	Homer	1	.....	25 years	A few barrels each year ...	Make it.
4	Homer	1	.....	12 years	5,000 gallons.....	Make it.
5	McGrawville	1	.....	11 years	100 barrels.....	Make it.
6	Blodgett Mills	1	.....	10 years	10 to 15 barrels	Make it.
7	Cortland	1	.....	20 years	50 to 100 barrels	Make a portion and buy cider.

CORTLAND COUNTY — (Continued).

Circular number.	POST-OFFICE.	Where is the fruit grown from which the cider or stock you use is made?	Do you manufacture a uniform or a varying strength of vinegar as to acidity?		If uniform what is the percentage of the acidity?	If of a varying strength, what is the lowest and greatest percentage of acidity that you manufacture?		Do you have any difficulty in producing in pure cider vinegar 4.5% of acidity?	
			Uniform.	Varying.		Lowest.	Greatest.	Yea.	No.
1	Cortland.....	This and adjoining towns.....	.....	1	.....	.....	.....	.....	.....
2	East Freetown.....	Freetown.....	.....	1	.....	.....	.....	.....	.....
3	Homer.....	Vicinity.....	.....	1	.....	.....	.....	.....	1
4	Homer.....	Cortland county.....	.....	1	.....	4.5	8	.....	1
5	McGrawville.....	Vicinity.....	1	.....	4	.....	.....	1	.....
6	Blodgett Mills.....	Cortland county.....	.....	1	.....	.....	.....	1	.....
7	Cortland.....	Cortland and Tompkins counties.	.....	1	.....	.....	.....	.....	.....

CORTLAND COUNTY — (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?			Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?			Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?		
		Yes.	No.	If so, what are those conditions?	Yes.	No.	If so, what?	Yes.	No.	If so, how?
1	Cortland	1	....	Windfalls, green and early fruit is deficient in sugar, consequently in the elements to form acid.	1	....	Those ripening after the weather is cool, so that the change is longer taking place, are best for good and long-keeping cider.	1	....	There is a great difference even in sections near each other, while one orchard will produce cider rich in sugar and starch, one near, with different management and care, may be very deficient in these elements.
2	East Freetown .....	....	....	Never tested it; it will make in two years.	....	1	.....	....	....	.....
3	Homer .....	....	1	I do not, comparing with other standard makes.	1	....	Think so; not being an expert cannot state.	1	....	Think very likely.
4	Homer .....	....	....	.....	....	1	Ripe fruit will produce good vinegar.	....	1	Sweet apples will produce more acetic acid than sour apples.
5	McGrawville .....	....	1	Cannot produce it in one year; the fruit is all right, I think; perhaps my building is too cool to make it; think it is more in the place it is made in.	1	....	Early made cider will make vinegar sooner than late made, but it is lighter color.	....	....	.....
6	Blodgett Mills .....	....	....	.....	....	....	.....	....	....	.....
7	Cortland .....	....	....	From pure cider have no difficulty in producing good vinegar.	....	....	.....	....	1	Not enough to be noticeable.

CORTLAND COUNTY — (Concluded).

Circular number.	POST-OFFICE.	acid ?			4½%.	4%.	Remarks.	for of of d a ac- of
		Yes.	No.	If so, where ?				
1	Cortland .....	....	1	Probably not under fa- vorable circumstances	....	1	mixture often tell re is more cider than a positive ; test so I the same. I find so much acid vinegar in use that it is hard work to make it at a profit. Do not favor reducing the standard; think vinegar can be manufactured up to the standard, as at present; as I am not a scientific manufacturer, can give you but little information. I think this effort must be on the part of those who m (windfalls), or of middlemen or retailers who want to sell I think 4% acetic acid is strong enough for cider vi egar; man proper may 3.5% is too strong, while others want it stronger; there would be no fault found if cider vinegar would test 4% for the reason that it grows stronger by keeping it in a warm place. I am not much of a vinegar producer; make from 400 to 600 barrels of cider a year, but make v negar from what will not keep-as cider. My trad- is mostly local, both wholesale and retail, but do not test the percentage of acetic acid; judge of quality by taste only.	
2	East Freetown .....	....	1	Do not think there is any.	....	....
3	Homer .....	....	....	.....	1	....	
4	Homer .....	....	1	.....	3	....	
5	McGrawville .....	....	....	It is hard to get it there, but I don't know but take time enough if may possibly do it.	....	1		
6	Blodgett Mills .....	....	....	.....	....	....
7	Cortland .....	....	....	.....	....	....

DELAWARE COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manu- facture during one season?	Where do you get your cider or cider-vinegar stock?
		Yes.	No.			
1	Andes .....	.....	.....	.....	.....	.....
2	Kelly's Corners.....	1	.....	14 years	500 to 900 gallons	Vicinity.
3	Hamden.....	1	.....	27 years	5 to 12 barrels	Make it.
4	Masonville	1	.....	.....	.....	.....
5	North Franklin.....	1	.....	9 years	500 to 600 barrels	Make it.

DELAWARE COUNTY -- (Continued).

Circular number.	POST-OFFICE.	Where is the fruit grown from which the cider or stock you use is made?	Do you manufacture a uniform or a varying strength of vinegar as to acidity?		If uniform what is the percentage of the acidity?	If of a varying strength, what is the lowest and greatest percentage of acidity that you manufacture?			Do you have any difficulty in producing in pure cider vinegar 4.5% of acidity?	
			Uniform.	Varying.		Lowest.	Greatest.		Yea.	No.
1	Andes.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2	Kelly's Corners.....	Delaware county.....	.....	1	.....	.....	.....	.....	.....	.....
3	Hamden.....	Hamden, Delhi and Walton.....	.....	.....	.....	.....	.....	.....	.....	.....
4	Masonville.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
5	North Franklin.....	Town of Franklin, Delaware county.	.....	1	.....	.....	.....	.....	.....	.....

DELAWARE COUNTY — (Continued).

Circular number	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?			Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?			Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?		
		Yes.	No.	If so, what are those conditions?	Yes.	No.	If so, what?	Yes.	No.	If so, how?
1	Andes.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
2	Kelly's Corners.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
3	Hamden .....	.....	.....	.....	1	.....	Early apples make weak cider; about ten to twelve by the saccharometer; November cider is from fourteen to sixteen by the saccharometer.	.....	.....	.....
4	Masonville.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
5	North Franklin.....	.....	1	I do not think there is much difference in the fruit if the cider is rightly handled after making.	1	.....	The later in the season the more body there is to the cider.	.....	.....	.....

DELAWARE COUNTY — (Concluded).

Circular number.	POST-OFFICE.	Is there in this fruit w containing 4.5 per cent of acetic acid?			4 1/2%	4%	Remarks.
		Yes.	No.	If so, where?			
1	Aurora	1	Have not manufactured any vinegar standard; it is no trouble to make. We are in the old rut making cider sharp vinegar; use no test in regard strength; our trade is light, confined to the back or rural districts. The merchant mills are making vinegar from what is called second pressings, by picking an old cheese or pomace to pieces, saturating it with water and pressing for vinegar. I am not, strictly speaking, a cider vinegar manufacturer; have a cider mill and manufacture cider for those residing in vicinity; I sell during the year, probably about fifty gallons of vinegar. There is very little vinegar, among small manufacturers, that ever gets up to the test, as it is almost impossible to get it there without using acids or something of that kind.
2	Kelly's Corners .....	.....	.....	.....	.....	.....
3	Hamden .....	.....	.....	.....	.....	.....
4	Masonville .....	.....	.....	.....	.....	.....
5	North Franklin .....	.....	.....	.....	.....	.....

The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been and is still being made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.

DUTCHESS COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar ?		How long have you been such ?	How much do you manufacture during one season ?	Where do you get your cider or cider-vin-gar stock ?
		Yes.	No.			
1	Dover Plains	1	.....	6 years	1,000 barrels	Westchester, Dutchess and Columbia counties.
2	Hyde Park	1	.....	20 years .....	.....	Vicinity.
3	Pleasant Valley	1	.....	3 years	2,000 to 3,000 gallons.....	Make it.
4	Red Hook	1	.....	.....	2 barrels.....	Make it.
5	Rhinebeck.....	.....	1	.....	.....	.....
6	Manchester Bridge	1	.....	15 years	10 to 20 barrels	Make it.
7	Millbrook.....	.....	1	15 years	30,000 gallons cider	Town of Washington, Dutchess county.
8	Mansfield.....	1	.....	25 years	25 barrels.....	Make it.
9	Millbrook.....	1	.....	20 years	10 to 100 barrels	Make it.
10	Rhinebeck.....	1	.....	5 years	5 or 6 barrels	Make it.
11	Stormville.....	1	.....	17 years	50 casks	Make it.
12	Verbank.....	.....	1	10 years .....	.....	Make it.

DUTCHESS COUNTY — (Continued).

Circular number.	POST-OFFICE.	Where is the fruit grown from which the cider or stock you use is made?	Do you manufacture a uniform or a varying strength of vinegar as to acidity?		If uniform what is the percentage of the acidity?	If of a varying strength, what is the lowest and greatest acidity that you manufacture?		Do you have any difficulty in producing in pure cider vinegar 4.5% of acidity?	
			Uniform.	Varying.		Lowest.	Greatest.	Yes.	No.
1	Dover Plains	Westchester, Dutchess and Columbia counties.	.....	1	.....	3.7	5.6	.....	1
2	Hyde Park	Hyde Park .....	.....	.....	.....	.....	.....	.....	.....
3	Pleasant Valley	Vicinity .....	.....	1	.....	4	4.4	1	.....
4	Red Hook	At home.....	.....	.....	.....	.....	.....	.....	.....
5	Rhinebeck.....	.....	.....	.....	.....	.....	.....	.....	.....
6	Manchester Bridge.....	.....	.....	1	.....	3	4.5	1	.....
7	Millbrook.....	Vicinity .....	.....	.....	.....	.....	.....	.....	1
8	Mansfield.....	Our own orchard.....	.....	1	.....	4	5	1	.....
9	Millbrook.....	Millbrook.....	1	.....	4.5	.....	.....	.....	1
10	Rhinebeck.....	Own orchard .....	.....	.....	.....	.....	.....	.....	.....
11	Stormville.....	Towns of Fishkill, East Fishkill and Beekman.	.....	1	.....	.....	.....	.....	.....
12	Verbank.....	Dutchess county .....	.....	1	.....	3	3.5	1	.....

NEW YORK STATE DAIRY COMMISSIONER.

DUTCHESS COUNTY — (Continued).

Circular number.	POST-OFFICE	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	Yes.	No.	Yes.	No.
1	Dover Plains.....	.....	.....	1	.....	.....	.....
2	Hyde Park.....	.....	.....	.....	.....	.....	.....
3	Pleasant Valley.....	.....	1	1	.....	.....	.....
4	Red Hook.....	.....	.....	.....	.....	.....	.....
5	Rhinebeck.....	.....	.....	.....	.....	.....	.....
6	Manchester Bridge.....	1	.....	1	.....	.....	.....
7	Millbrook.....	.....	.....	1	.....	.....	.....
8	Marshallfield.....	1	.....	1	.....	.....	.....
9	Millbrook.....	.....	1	1	.....	.....	.....
10	Rhinebeck.....	.....	.....	.....	.....	.....	.....
11	Stormville.....	.....	.....	.....	.....	.....	.....
12	Verbank.....	1	.....	.....	1	.....	.....

DUTCHESS COUNTY —(Concluded).

Circular number.	POST-OFFICE.	SCHOOLS.			If so, where?	4½%.	4%.	Remarks.
		Yes.	No.	?				
1	Dover Plains	1	I believe, with proper knowledge of the method of manufacture of vinegar, there is no difficulty in producing the present standard and I would be in favor of maintaining it. Percentage I know nothing about; I have no interest in this matter; I want to sell a my trade is mostly sweet cider stand it is that I it; it cider sell a f
2	Hyde Park .....	.....	1	.....	I do not think there is.	.....	.....
3	Pleasant Valley	1	.....	.....	Pleasant Valley .....	.....	1
4	Red Hook	is all I do in the vinegar line. I have a cider mill and make a large amount of cider; sell at a low price when juicy; have not gone into the vinegar business on account of the high percentage required by law.
5	Rhinebeck.....	.....	.....	.....	.....	.....	.....
6	Manchester Bridge.....	.....	.....	.....	.....	.....	1
7	Millbrook.....	to bring it up it; make very it is as strong r and vinegar what use acid phur of iron if the desired cider- o 4½% many
8	Mansfield.....	1	strength The reducing of the standard from 4½% to 4% vinegar makers, as it is very difficult to raise I think a change is not necessary; the law dollars to me.
9	Millbrook.....	.....	.....	.....	.....	1	.....
10	Rhinebeck.....	.....	.....	.....	.....	.....	.....
11	Stormville.....	I do not know the percentage of acidity; do not use any test; use my judgment as to when it is of proper strength. I made vinegar for ten years; since the law made the standard 4½% quit making; the standard is too high; the law should be changed; 4.5% is more than pickles will bear.
12	Verbank.....	.....	.....	.....	.....	.....	1

ERIE COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar ?		How long have you been such ?	How much do you manufacture during one season ?	Where do you get your c'der or cider-vinegar stock ?
		Yes.	No.			
1	Abbotts	1	.....	16 years	100 to 800 barrels .	This year from the east.
2	Bowmansville.....	1	.....	20 years	5 barrels.....	Vicinity.
3	Buffalo .....	.....	1	I have been some years ago.	None .....	.....
4	Buffalo .....	.....	1	.....	.....	.....
5	Buffalo	1	.....	20 years .....	.....	From small quantities of
6	Harris Hill	1	.....	10 years	3 to 4 forty-gallon casks.....	cider purchased of customers.
7	Elma	1	.....	16 years	200 barrels.....	Make it.
8	Lancaster	1	.....	4 years	6 to 8 barrels	Make it.
9	North Collins.....	1	.....	4 years	10,000 to 20,000 gallons.....	Make it.
10	North Collins.....	1	.....	Not long.....	.....	.....
11	Tonawanda	1	.....	30 years*	36 to 40 barrels	Niagara and Erie counties.
12	Tonawanda	1	.....	9 years	10,000 to 15,000 casks.....	Make it.
13	Water Valley .....	.....	1	Previous to 1888 .....	.....	.....
14	Williamsville	1	.....	8 years	200 barrels	From farmers in vicinity.
15	Colden	1	.....	16 years	2 barrels.....	Make it.
16	Abbots	1	.....	15 years	Amount varies	Make it.
17	Angola	1	.....	10 years	500 barrels.....	Make it.
18	Collins Centre.....	1	.....	25 years .....	.....	.....
19	Ebenezer	1	.....	25 years	80 barrels.....	Make it
20	Eden Centre.....	1	.....	40 years	20 barrels.....	Make it.
21	North Collins.....	1	.....	20 years	100 barrels.....	Buy it at North Collins.
22	Orchard Park .....	.....	1	.....	.....	Vicinity.
23	Wales Centre.....	1	.....	20 years	1 to 2 barrels	Make it.
24	Getzville.....	1	.....	8 years	2,000 to 3,000 bbls. of cider..	Make it.

* Twenty years in France and Germany and ten years in America.

ERIE COUNTY — (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes	No.	Yes.	No.	Yes.	No.
12	Tonawanda.....	.....	.....	.....	1	.....	1
13	Water Valley.....	.....	.....	.....	.....	.....	.....
14	Williamsville.....	.....	.....	.....	.....	.....	.....
15	Colden.....	.....	.....	.....	.....	.....	.....
16	Abbotts.....	.....	.....	1	.....	.....	.....
17	Angola.....	.....	.....	.....	1	.....	.....
18	Collins Centre.....	.....	.....	.....	.....	.....	.....
19	Ebenezer.....	.....	.....	.....	.....	.....	.....
20	Eden Centre.....	.....	.....	.....	1	.....	.....
21	North Collins.....	1	.....	1	.....	1	.....
22	Orchard Park.....	1	.....	.....	1	.....	.....
23	Wales Centre.....	.....	1	.....	.....	.....	.....
24	Getzville.....	.....	.....	.....	.....	.....	.....

If so, how?

Yes.

If so, what?

Yes.

If so, what are those conditions?

Yes.

No.

No.

No.

We have pressed apples from all parts of this State, also from the western and southern States, and never failed to get 4.5% acetic acid or over

If apples are ripe they will produce, at least, 4.5% vinegar, if the juice is properly fermented and no water added.

Do not know, as I have no tester and limited experience.

Early apples do not make as good cider or vinegar as late fruit.

By mixing stock from early and late apples have no trouble in making 4.5% or stronger.

The only apples I ever used for vinegar was from Erie and Niagara counties, and they vary the same

Do not know why they should.

Apples in the southern tier of counties are not as rich as those grown in Chautauque, Erie, Niagara, Genesee and Monroe counties.

Apples ripening early in the season do not contain as much sugar as those ripening later.

Apples ripening early in the season do not contain as much sugar as those ripening later.

ERIE COUNTY — (Continued).

ERIE COUNTY — (Concluded).

Circular number.	POST-OFFICE.	1 containing 4.5 per cent of acetic acid?			4½%.	4%.	Remarks.
		Yes.	No.	If so, where?			
13	Water Valley	1	I think the law of the State in regard to cider vinegar should be enforced; also that the standard of 4.5 acetic acid should not be changed. I make cider vinegar for my own use; occasionally sell a gallon, and once in a great
14	Williamsville .....	....	....	.....	....	....
15	Colden .....	....	....	.....	....	....
16	Abbotts	1	I think there is much pure cider that will not make a vinegar of more than 4½ acetic acid; when I have a thin cider I fortify with sugar or alcohol to make a strong vinegar. The percentage I care nothing about; the best way to make vinegar is to put a pail of good, clear, soft water to a forty-five gallon barrel of cider and place it where it is warm. I am opposed to any reduction in the strength; I cannot tell the percentage of acidity. I am not much interested in vinegar; being so near Buffalo and Tonawanda I have a good trade in sweet cider, so do not make a business of vinegar.
17	Angola .....	....	....	.....	1	....
18	Collins Centre .....	....	....	.....	....	....
19	Ebenezer	I think there is much pure cider that will not make a vinegar of more than 4½ acetic acid; when I have a thin cider I fortify with sugar or alcohol to make a strong vinegar. The percentage I care nothing about; the best way to make vinegar is to put a pail of good, clear, soft water to a forty-five gallon barrel of cider and place it where it is warm. I am opposed to any reduction in the strength; I cannot tell the percentage of acidity. I am not much interested in vinegar; being so near Buffalo and Tonawanda I have a good trade in sweet cider, so do not make a business of vinegar.
20	Eden Centre .....	....	....	.....	1	....
21	North Collins .....	....	....	.....	....	....
22	Orchard Park	I think there is much pure cider that will not make a vinegar of more than 4½ acetic acid; when I have a thin cider I fortify with sugar or alcohol to make a strong vinegar. The percentage I care nothing about; the best way to make vinegar is to put a pail of good, clear, soft water to a forty-five gallon barrel of cider and place it where it is warm. I am opposed to any reduction in the strength; I cannot tell the percentage of acidity. I am not much interested in vinegar; being so near Buffalo and Tonawanda I have a good trade in sweet cider, so do not make a business of vinegar.
23	Wales Centre .....	....	....	.....	1	....
24	Gettysville .....	....	....	.....	....	....

ESSEX COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar ?		How long have you been such ?	How much do you manufacture during one season ?	Where do you get your cider or elder-vinegar stock ?
		Yes.	No.			
1	Crown Point.....4.....	1	.....	10 years	75 barrels.....	Make it.
2	Elizabethtown.....	1	.....	16 years	400 to 800 barrels	Make it; use an old-fashioned wooden mill.
3	Elizabethtown.....	1	.....	25 or 30 years.....	4 casks of 44 gallons each ..	Make it.
4	Morlah	1	.....	4 years	75 barrels.....	Make it.

ESSEX COUNTY — (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	Yes.	No.	Yes.	No.
1	Crown Point.....	.....	.....	1	....	.....	....
		.....		Early ripening fruit is not so rich and does not contain so much sugar and will not make so acid a vinegar as late.		.....
2	Elizabethtown .....	.....	.....	.....	1	.....	1
		.....		If apples are ripe they will produce a uniform acidity.		They will not.	
3	Elizabethtown .....	.....	.....	1	....	1	....
		.....		Think it does; the earliest are the best		They will; crab apples; some are more sour than others.	
4	Moriah.....	.....	.....	.....	.....	.....	.....

Essex County — (Concluded).

FRANKLIN COUNTY.

<p>POST-OFFICE.</p> <p>Malone</p>	<p>Are you a manufacturer of cider vinegar?</p>		<p>How long have you been such?</p>	<p>How much do you manufacture during one season?</p>	<p>Where do you get your cider or cider-vinegar stock?</p>	<p>Where is the fruit grown from which the cider or stock you use is made?</p>	<p>The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been made to still being made to reduce the standard to 4 per cent of acetic acid as to Please answer questions daily.</p>
	<p>Yes.</p>	<p>No.</p>						10 years	5 barrels	Malone	Malone
<p>Circular number.</p>	<p>1</p>						<p>Remarks.</p>
<p>I make so small an amount of vinegar that very little attention is paid to it, and hence I am unable to answer all the questions.</p>							

FULTON COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manufacture during one season?	Where do you get your cider or cider-vinegar stock?
		Yes.	No.			
1	Ephratah.....	1	.....	40 years	150 barrels.....	Vicinity.
2	Gloversville	1	.....	10 years	30 to 40 casks	Vicinity.
3	Mayfield.....	1	.....	20 years	125 barrels.....	Vicinity.
4	Gloversville	1	.....	1 year	2,000 gallons.....	Make it.
5	Perth.....	1	.....	20 years	50 casks	Make it.

FULTON COUNTY—(Continued).

Circular number.	POST-OFFICE.	Where is the fruit grown from which the cider or stock you use is made?	Do you manufacture a uniform or a varying strength of vinegar as to acidity?		If uniform what is the percentage of the acidity?	If of a varying strength, what is the lowest and greatest percentage of acidity that you manufacture?		Do you have any of acidity?	
			Uniform.	Varying.		Lowest.	Greatest.	Yes.	No.
1	Ephratah.....	.....	.....	1	.....	3	5	.....	1
2	Gloversville.....	Towns of Johnston and Mayfield, Fulton county.	.....	.....	.....	.....	.....	.....	.....
3	Mayfield.....	Town of Mayfield.....	.....	.....	.....	.....	.....	.....	1
4	Gloversville.....	Fulton county.....	.....	.....	.....	.....	.....	.....	.....
5	Perth.....	Fulton and Montgomery counties.	.....	1	.....	.....	.....	.....	.....

FULTON COUNTY—(Continued).

Circuler number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	If so, what are those conditions?	Yes.	No.	If so, how?
1	Ephratah .....	....	1	fruit with a proper cider ungrafted bitter and	....	1	.....
2	Gloverville.....	....	....	.....	....	....	.....
3	Mayfield .....	....	1	.....	1	....	.....
4	Gloverville.....	....	....	.....	....	....	.....
5	Perth	1	....	Sweet apples make the strongest vinegar; early, sour apples the poorest; winter fruit produces the best cider and makes the best vinegar.	1	....	The soil and locality of the orchard, sun, air (cold or warm) at certain times of growing the apple produces results as to the quality.

GENESEE COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manu- facture during one season?	Where do you get your cider or cider-vinegar stock?
		Yes.	No.			
1	East Pembroke.....	.....	1	25 years .....	.....	Make it.
2	Linden.	1	.....	4 years	100 to 200 casks	Make it.
3	Oakfield	1	.....	2 years	3,000 to 4,000 barrels.....	Make it.
4	South Byron.....	1	.....	12 years	15 to 20 barrels	Make it.
5	Stafford	1	.....	20 years	20 to 40 barrels	Genesee county.
6	Stone Church.....	1	.....	20 years	50 barrels.....	Make it.

GENESEE COUNTY — (Continued).

Circular number.	POST-OFFICE.	Where is the fruit grown from which the cider or stock you use is made?	Do you manufacture a uniform or a varying strength of vinegar as to acidity?		If uniform what is the percentage of the acidity?	If of a varying strength, what is the lowest and greatest acidity that you manufacture?		Do you have any difficulty in producing in pure cider vinegar 4.5% of acidity?	
			Uniform.	Varying.		Lowest.	Greatest.	Yes.	No.
1	East Pembroke.....	Towns of Batavia and Pembroke	.....	1	.....	*12	*30	.....	.....
2	Linden	Genesee and Wyoming counties.	.....	1	.....	4.5	5	1	.....
3	Oakfield	Genesee, Monroe and Wayne counties.	.....	1	.....	4.2	6	.....	1
4	South Byron	Genesee and Orleans counties..	1	.....	4.5	.....	.....	1	.....
5	Stafford	Genesee county.....	1	.....	.....	.....	.....	.....	.....
6	Stone Church	Genesee county	1	.....	4.5	.....	.....	.....	1

* This is undoubtedly an error.

GENESEE COUNTY — (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		If so, what are those conditions?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	Yes.	No.	Yes.	No.	Yes.	No.
1	East Pembroke.....	....	1	1	....	1	....	....	....
2	Linden.....	1	....	1	....	1	....	1	....
3	Oakfield.....	....	1	1	....	1	....	....	....
4	South Byron.....	....	....	1	....	1	....	....	....
5	Stafford.....	....	....	....	....	1	....	....	....
6	Stone Church.....	....	....	....	....	1	....	....	....

Would think 4 b $\frac{1}{2}$ a very low grade; the lowest grade of cider is 12.

It is due to immature fruit; seasons differ and fruit contains more acid some seasons than others.

Fruit should be properly taken care of.

as late crop.
I prefer the last of September and the first of October.

Do not know the cause of it, but suppose it is in the climate, soil, etc.; know it takes our best cider to make 4 b $\frac{1}{2}$ vinegar.

We have not discovered any yet.

GENESSEE COUNTY — (Concluded).

Circular number.	POST-OFFICE.	Is there any apple-growing section in this State where the ripened fruit will not produce a vinegar containing 4.5 per cent of acetic acid?		If so, where?	4 1/2%.	4%.	Remarks.
		Yes.	No.				
1	East Pembroke.....	.....	1	Not that I know of.....	1	.....	Think 4.5% very low grade; pure cider vinegar will produce a much higher grade if allowed to stand until it turns to vinegar; my cider was tested with a saccharometer; too much acid and water is used to make vinegar quick
2	Linden	1	.....	I understand that about all the earlier counties are in that condition.	.....	1	I think the law should be changed to 4% as that is good, strong vinegar; good as people are in the habit of using; as some parts of our State cannot make it readily of the standard strength it seems to bear rather heavily on them and is not exactly fair to all concerned; we have a good many apples in this part of the State that will not make 4.5% vinegar; would therefore advise a change from 4.5% to 4%.
3	Oakfield .....	.....	1	Not if they are properly managed and the cider taken proper care of..	1	...	We are well pleased and ask to have it remain as at present; you will see we are new beginners and have had no trouble in people work at this; there is any amount the market now; what would it be if the
4	South Byron .....	.....	.....	.....	.....	1	Think it would be best to reduce the standard to 4% as the vinegar manufacturers use inferior stock, not pure cider; the most of the vinegar sold in town and country is no dealer buys inferior grade and sells it for the best.
5	Stafford .....	.....	.....	.....	1	.....	Do not
6	Stone Church .....	.....	1	I do not know of any place.	1	.....	The at 4.5%.

The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been and is still being made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.

GREENE COUNTY.

Circular number	POST-OFFICE.	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manufacture during one season?	Where do you get your cider or cider-vinegar stock?
		Yes.	No.			
1	Freehold .....	.....	1	15 years	25 casks	Being a cider maker, get my stock from surplus.
2	Lexington.....	1	.....	1 year.....	.....	Vicinity.
3	Oak Hill.....	1	.....	8 years	10 to 15 barrels	Make it.
4	South Cairo	1	.....	20 years	15 to 25 barrels	Make it.
5	Athens	1	.....	.....	.....	Make it.
6	Catakill.....	1	.....	12 years	200 to 500 barrels	Make it.
7	Greenville	1	.....	20 years	10 to 20 barrels	Make it.

GREENE COUNTY — (Continued).

Circular number.	POST-OFFICE.	Where is the fruit grown from which the cider or stock you use is made?	Do you manufacture a uniform or a varying strength of vinegar as to acidity?		If uniform what is the percentage of the acidity?	If of a varying strength, what is the lowest and greatest percentage of acidity that you manufacture?		Do you have any difficulty in producing in pure cider vinegar 4.5% of acidity?	
			Uniform.	Varying.		Lowest.	Greatest.	Yes.	No.
1	Freehold	Town of Greenville, Greene county.	.....	1	.....	.....	.....	.....	.....
2	Lexington.....	Vicinity .....	.....	.....	.....	.....	.....	.....	.....
3	Oak Hill.....	Vicinity .....	.....	1	.....	.....	.....	.....	.....
4	South Carlo	Vicinity .....	.....	1	.....	.....	.....	.....	.....
5	Athens	Vicinity .....	.....	.....	.....	.....	.....	.....	.....
6	Catakill.....	Greene, Columbia and Ulster counties.	1	.....	4.5	.....	.....	1	.....
7	Greenville	Town of Greenville.....	1	.....	5	.....	.....	.....	1

GREENE COUNTY — (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	If so, what are those conditions?	Yes.	No.	If so, how?
1	Freehold.....	.....	.....	.....	1	.....	.....
2	Lexington.....	.....	.....	.....	.....	.....	.....
3	Oak Hill.....	.....	.....	Never tested it.....	1	.....	.....
4	South Carlo.....	.....	.....	.....	.....	.....	.....
5	Athens.....	.....	.....	.....	.....	.....	.....
6	Catskill.....	1	.....	Presume it is due to the time of year; hot weather.....	1	.....	.....
7	Greenville.....	.....	.....	.....	.....	1	Think not.....

GREENE COUNTY — (Concluded).

Circular number.	POST-OFFICE.	Is there in this fruit w containing 4.5 per cent of acetic acid?		If so, where?		4½%	4%	Remarks.
		Yes.	No.					
1	Freehold .....	.....	.....	.....	.....	1	.....	Think 4.5% should be the standard; market; there is no excuse for apples, clean cider-press and good. better article to be put upon the post makers produce; good sound makes 4.5% every time.
2	Lexington .....	.....	.....	.....	.....	.....	.....	I have not been engaged in the business long enough to form any view on that matter; know there is a great difference in the quality of cider produced from the same kind of apples in different seasons.
3	Oak Hill.....	.....	.....	.....	.....	.....	1	Think 4% is best, and consider the vinegar better adapted to family use, keeping pickles, etc., better than that which is stronger.
4	South Oelro .....	.....	.....	.....	.....	.....	1	Think standard too high; 4% would be about right.
5	Athens .....	.....	.....	.....	.....	.....	.....	a general sense; we raise fruit for market which becomes vinegar; we believe in a law
6	Catskill.....	.....	1	Not from apples that mature the middle of after; about would making 4.5% vinegar of.	.....	.....	.....	.....
7	Greenville .....	.....	.....	.....	.....	.....	.....	I have never thought much about it, and have no particular views on the subject.

HERKIMER COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar ?		How long have you been such ?	How much do you manufacture during one season ?	Where do you get your cider or cider-vinegar stock ?
		Yes.	No.			
1	Frankfort	1	.....	5 years.....	All we can sell.....	Make it.....
2	Ilton	1	.....	27 years.....	25 barrels.....	Make it.....
3	Newport.....	.....	1	.....	.....	.....
4	Center.....	1	.....	9 years.....	50 barrels.....	Make it.....
5	West Winfield.....	1	30 years.....	2,000 to 8,000 gallons.....	Make it.....

HERKIMER COUNTY — (Continued).

Circular number

1
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HERKIMER COUNTY — (Concluded).

Circular number.	POST-OFFICE.	acid ?			The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been and is still being made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.	Remarks.	
		Yes.	No.	If so, where ?	4 1/2%	4%	
1	Frankfort.....	....	1	Do not believe there is; at the refined cider mill.	1	....
2	Ilion.....	....	....	.....	....	....
3	Newport.....	....	....	.....	....	....
4	Canter.....	....	....	.....	1	....
5	West Winfield.....	....	....	.....	....	....

JEFFERSON COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manufacture during one season?	Where do you get your cider or cider-vinegar stock?
		Yes.	No.			
1	East Houndsfield.....	1	.....	4 years	40 to 80 casks.....	From the juice of apples.
2	Ellisburgh.....	1	.....	15 years	200 to 300 barrels	Make it.
3	Erieville.....	.....	1	13 years	300 barrels vinegar	Bought from farmers in own town and county.
4	Pierrepont Manor	1	.....	22 years	2,000 gallons.....	Make it.
5	Belleville.	1	.....	20 years	200 or 300 gallons	Make it.
6	Champion	1	.....	Since 1885	5 to 50 barrels	Make it.

JEFFERSON COUNTY — (Continued).

Circular number.	POST-OFFICE.	Where is the fruit grown from which the cider or stock you use is made?	Do you manufacture a uniform or a varying strength of vinegar as to acidity?		If uniform what is the percentage of the acidity?	If of a varying strength, what is the lowest and greatest percentage of acidity that you manufacture?		Do you have any difficulty in producing in pure cider vinegar 4.5% of acidity?	
			Uniform.	Varying.		Lowest.	Greatest.	Yes.	No.
1	East Houdanfield.....	Jefferson county .....	.....	.....	.....	.....	.....	.....	.....
2	Ellisburgh.....	Vicinity	1	.....	4.5	.....	.....	.....	1
3	Erleville.....	Towns of Nelson, Eaton, Georgetown, Jenner and Cazenovia, Madison county.	.....	1	.....	4.83	4.65	.....	1
4	Pierrepont Manor	Towns of Ellisburgh, Lorraine and Adams, Jefferson county.	.....	1	.....	.....	.....	1	.....
5	Belleville	Henderson, Adams and Ellisburgh.	.....	.....	.....	.....	.....	.....	.....
6	Champion	Town of Champion.....	1	.....	4.5	.....	.....	1	.....

JEFFERSON COUNTY — (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes	No.	If so, what are those conditions?	Yes.	No.	If so, how?
1	East Houndsfield.....	....	....	.....	1	....	.....
2	Ellisburgh.....	....	1	Only as it takes more time and labor.	1	....	.....
3	Erleville.....	....	....	Never with sweet apples; many times it went above 4.5%; if I had any difficulty it was with decayed fruit, or fruit grown in low, moist ground or with fruit that had been frozen until it had lost its vitality.	1	....	In different towns it will vary in acids; on clay land the acid is low, while on sub-soil and gravelly land it will run very high, if made in September and October.
4	Pierrepont Manor.....	1	....	I have difficulty in making strong vinegar from some cider; unripe fruits.	1	....	.....
5	Belleville.....	....	....	.....	1	....	.....
6	Champion.....	1	....	I think it is due to the season.	....	1	Think they do.....

JEFFERSON COUNTY — (Concluded).

Circular number.	If apple-growing section late where the ripened not produce a vinegar of 4.5 per cent of acetic		If no, where?		The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been and is still being made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.	Remarks.	
					1/4%	4%	
1	East Hounsfield					1	
2	Ellisburgh					1	
3	Erieville				1		
4	Pierrepont Manor					1	
5	Belleville						
6	Champion						

KINGS COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manufacture during one season?	Where do you get your cider or cider-vinegar stock?
		Yes.	No.			
1	Brooklyn	1	.....	22 years	18,000 barrels of 32 gallons each.	Mostly from Albany, Greene Ulster and Westchester counties.
2	Brooklyn .....	.....	1	.....	.....	.....
3	Brooklyn	1	.....	15 years	100 to 300 barrels	New York State mostly.
4	Brooklyn .....	.....	1	14 years	100 barrels.....	Nanuet, N. Y., Northport, N. Y., and Bayville, N. Y.
5	Brooklyn .....	.....	1	.....	.....	.....
6	Brooklyn .....	.....	1	.....	.....	.....
7	Brooklyn .....	.....	1	.....	.....	From Reeve & Meinhold and Heineman & Schlegel, Brooklyn.....

KINGS COUNTY — (Continued).

Circular number	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the to do with they will		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	Yes.	No.	Yes.	No.
1	Brooklyn	1	.....	1	.....	1	.....
		If so, what are those conditions?		If so, what?		If so, how?	
		1	.....	1	.....	1	.....
		I found it last season, impossible, with at least one-third of all my pure cider, particularly that made before the tenth of October.		Early apples contain less sugar, and produce less acetic acid.		A	
2	Brooklyn	.....	.....	1	.....	1	.....
		.....		Early apples contain less saccharine matter than late ones; it differs in different kinds of apples.		Apples will be more watery in some localities; also, some apples contain more malic acid and less sugar, and vice versa.	
3	Brooklyn	.....	.....	1	.....	1	.....
		Early fruit, largely.		Early apples seem deficient in saccharine matter.		By excess or deficiency in saccharine matter.	
4	Brooklyn	.....	1	.....	1	.....	.....
		At first from inexperience and afterward from neglect; temperature, at times too warm, at others too cold.		any great grown on it produce as those in the State, vinegar is		.....
5	Brooklyn	.....	.....	.....	.....	.....	.....
6	Brooklyn	.....	.....	.....	.....	.....	.....
7	Brooklyn	.....	.....	.....	.....	.....	.....

KINGS COUNTY -- (Concluded).

LIVINGSTON COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manufacture during one season?	Where do you get your cider or cider-vinegar stock?
		Yes.	No.			
1	Hunt's.....	.....	1	.....	.....	.....
2	Lakeville.....	1	.....	4 years.....	10,000 gallons.....	Make it.....
3	Livonia.....	1	.....	14 years.....	25 to 30 barrels.....	Make it.....
4	Mount Morris.....	.....	1	.....	.....	.....
5	Mount Morris.....	1	.....	10 years.....	50 barrels.....	Make it.....
6	North Sparta.....	1	.....	10 years.....	40 to 1,000 barrels.....	At Kysorville.
7	Spring Water.....	1	.....	7 years.....	300 to 400 barrels.....	Make it.
8	Genese.....	1	.....	7 years.....	3 or 4 barrels.....	Make it.
9	Hemlock Lake.....	1	.....	12 years.....	30 barrels.....	Make it.
10	Livonia Center.....	1	.....	10 years.....	2 to 15 barrels.....	Make it.
11	York.....	.....	1	.....	.....	Make it.
12	York.....	1	.....	16 years.....	15 to 30 casks.....	Livingston county.

LIVINGSTON COUNTY -- (Continued).

Circular number.	POST-OFFICE.	Where is the fruit grown from which the cider or stock you use is made?	Do you manufacture a uniform or a varying strength of vinegar as to acidity?		If uniform what is the percentage of the acidity?	If of a varying strength, what is the lowest and greatest acidity that you manufacture?		Do you have any difficulty in producing in pure cider vinegar 4.5% of acidity?	
			Uniform.	Varying.		Lowest.	Greatest.	Yes.	No.
1	Hunt's.....	Vicinity of Conesus lake, Livingston county.	.....	.....	.....	.....	.....	.....	.....
2	Lakeville.....	Vicinity.....	.....	1	.....	4.5	4.7	.....	1
3	Livonia.....	Vicinity.....	.....	.....	.....	.....	.....	.....	.....
4	Mount Morris.....	Vicinity.....	.....	.....	.....	.....	.....	.....	.....
5	Mount Morris.....	West Sparta, Groveland, Ossian and Mount Morris.....	.....	.....	.....	.....	.....	1	.....
6	North Sparta.....	Candice, Ontario county.....	.....	1	.....	3.5	5	1	.....
7	Spring Water.....	Town of Genesee.....	1	.....	.....	.....	.....	.....	1
8	Genesee.....	Livingston and Ontario.....	.....	.....	4.5	.....	.....	.....	.....
9	Hemlock lake.....	Livonia.....	1	.....	.....	.....	.....	.....	1
10	Livonia Center.....	.....	.....	.....	.....	.....	.....	.....	.....
11	York.....	.....	.....	.....	.....	.....	.....	.....	.....
12	York.....	Livingston county.....	1	.....	4	.....	.....	1	.....

LIVINGSTON COUNTY — (Continued).

Circular Number	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	If so, what are those conditions?	Yes.	No.	If so, how?
1	Hunt's.....	.....	.....	.....	.....	.....	.....
2	Lakeville	1	.....	Apples that blow off the trees before they are ripe; I have no difficulty if apples are all right.	1	.....	Apples raised near the lake make better vinegar.
3	Livonia.....	.....	.....	.....	.....	.....	.....
4	Mount Morris.....	.....	.....	.....	.....	.....	.....
5	Mount Morris.....	.....	.....	.....	1	.....	.....
6	North Sparta	1	.....	It is; early apples and unripe fruit.	1	.....	Apples grown on low or wet land, or light soil do not contain as much acid as those grown on dry or heavy land.
7	Spring Water.....	.....	.....	.....	1	.....	Think not.
8	Genesee .....	.....	.....	.....	.....	.....	.....
9	Hemlock Lake.....	.....	.....	.....	1	.....	.....
10	Livonia Center .....	.....	.....	.....	.....	.....	.....
11	York.....	.....	.....	.....	.....	1	Do not think it makes any difference where they are grown if they are fully exposed to the sun; if not, the acetic acid is less.
12	York.....	1	.....	As to maturity of apples.....	.....	.....	.....

LIVINGSTON COUNTY — (Concluded).

Circular number.	POST-OFFICE.	Acid ?			If so, where ?	4½.	4%.	Remarks.
		Yes.	No.					
1	Hunt's.....	.....	.....	.....	.....	.....	.....	I was formerly engaged in making cider and had more or less to do with vinegar; I could be a
2	Lakeville .....	.....	.....	.....	.....	1	.....	generator good as
3	Livonia.....	.....	.....	.....	.....	.....	.....	to a pure
4	Mount Morris .....	.....	.....	.....	.....	1	.....	.5% acetic and our
5	Mount Morris .....	.....	.....	.....	.....	.....	1	at stage;
6	North Sparta.....	1	.....	.....	All low, wet, light lands	.....	.....	could be
7	Spring Water .....	.....	1	.....	Think not.....	.....	.....	o need of
8	Genesee .....	.....	.....	.....	.....	.....	.....	herefore,
9	Hemlock Lake .....	.....	.....	.....	.....	.....	.....	re second
10	Livonia Center .....	.....	.....	.....	.....	.....	.....	erences to
11	York .....	.....	.....	.....	.....	1	.....
12	York .....	.....	.....	.....	.....	.....	1	

THE IF THE STANDARD IS LOWERED OR NOT.

The standard should not be reduced below 4.5%; if it is it will be at the expense of adulterating.

MADISON COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manufacture during one season?	Where do you get your cider or cider-vinegar stock?
		Yea.	No.			
1	Bouckville.....	1	.....	27 years	10,000 to 30,000 barrels.....	Make it.
2	Brookfield.....	.....	1	.....	.....	.....
3	Canastota.....	1	.....	35 years	About 12,000 barrels of 45 gallons each.	Make it.
4	East Boston.....	.....	1	Since 1886 .....	.....	In the vicinity of where the mill is located.
5	Hamilton.....	.....	1	.....	.....	.....
6	Lebanon.....	1	.....	15 years	30 to 50 barrels .....	.....
7	Oneida Valley.....	1	.....	15 years	800 to 1,500 barrels.....	Make it.
8	Morrisville Station .....	.....	1	12 years	100 to 1,000 barrels.....	Made it.
9	Madison.....	1	.....	5 years	Few barrels	Made it.
10	Cazenovia.....	1	.....	.....	.....	.....
11	Chittenango.....	1	.....	30 years	4,000 to 7,000 barrels	Central New York, chief between Albany and Buffalo.
12	Chittenango.....	1	.....	.....	.....	.....
13	Clockville.....	1	.....	20 years	50 to 100 barrels	Make it.
14	Erleville.....	.....	1	14 years	900 barrels.....	Made it.
15	Hobokenville.....	1	.....	25 years	6,532 gallons in 1892.....	Made it.
16	Peterboro	1	.....	10 years	30 to 50 barrels.....	From farmers.
17	Sheds	1	.....	10 years	50 to 256 casks.....	Vicinity.
18	South Hamilton.....	1	.....	20 years	10 to 50 barrels	Make it.

MADISON COUNTY — (Continued).

Circular number.	POST-OFFICE.	Where is the fruit grown from which the cider or stock you use is made?	Do you manufacture a uniform strength of vinegar as to acidity?		If uniform what is the percentage of the acidity?	If of a varying strength, what is the lowest and greatest acidity that you manufacture?		Do you have any difficulty in producing in pure cider vinegar 4.5% of acidity?	
			Uniform.	Varying.		Lowest.	Greatest.	Yes.	No.
1	Brockville.....	Central, southern and eastern New York mostly.	.....	1	.....	4	5.3	.....	1
2	Brookfield.....	.....	.....	.....	.....	4	5	.....	.....
3	Canastota.....	.....	.....	1	.....	.....	.....	1	.....
4	East Boston.....	Madison county.....	.....	.....	.....	.....	.....	1	.....
5	Hamilton.....	.....	.....	.....	.....	.....	.....	.....	.....
6	Lebanon.....	.....	.....	1	4.5	.....	4	.....	.....
7	Oneida Valley.....	..... in and Oswego had some from	1	.....	.....	.....	.....	.....	1
8	Morrisville Station.....	On my farm.....	.....	.....	.....	.....	.....	.....	.....
9	Madison.....	.....	.....	1	.....	.....	.....	.....	.....
10	Caumontville.....	.....	.....	.....	.....	.....	.....	.....	.....
11	Chittenango.....	Central New York, chiefly between Buffalo and Albany.	.....	1	.....	50 grs.....	60 grs.....	.....	1
12	Chittenango.....	.....	.....	.....	.....	.....	.....	.....	.....
13	Chittenango.....	Town of Lenox.....	.....	1	.....	4	6	.....	.....
14	Erleville.....	Different towns in Madison county.	.....	.....	.....	.....	.....	.....	.....
15	Hobokenville.....	Madison county.....	.....	1	.....	4	4.5	1	.....
16	Peterboro.....	Madison county.....	1	.....	4.5	.....	.....	.....	1
17	Sheds.....	Vicinity.....	.....	1	.....	4.5	.....	.....	.....
18	South Hamilton.....	Madison county.....	.....	1	.....	.....	.....	.....	.....

MADISON COUNTY — (Continued).

[illegible]

MADISON COUNTY — (Continuee).

Circular number.	POST-OFFICE	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	Yes.	No.	Yes.	No.
14	Erleville	1	....	1	....	1	....
		If so, what are those conditions?		If so, what?		If so, how?	
15	Hobokenville	1	....	1	....	1	....
		Both; also, fruit gathered too early, frozen and rotten fruit.		Unripe fruit does not contain as much acid as ripe fruit.		good mature cider can be made.	
16	Peterboro .....	....	....	....	....	....	....
17	Rheda .....	....	....	....	....	....	....
		A good corn year gives us ripe, mature fruit, which makes good vinegar.		A warm, open fall has the same beneficial effect on the apple crop that it has on the corn crop; in a wet season the cider is thin.		good mature cider can be made.	
18	South Hamilton .....	....	....	....	....	....	....
		Any difficulty in this section may be overcome by knowing how to handle the apples.		I do not see any difference... Early apples will not before they can be properly handled.		good mature cider can be made.	

MADISON COUNTY — (Continued).

Circular number.		Remarks.			
1	Bouckville.....	1	Every season we car fruit from whichever county has the most abundant crop, and have never discovered any difference.	1	Pure cider will always make by vinegar unless allowed to remain in an open tank all summer, and that, certainly, is no fault of the fruit but simply stupidity on the part of the maker; I should very much regret to see the law changed.
2	Brookfield.....				is all sold sweet; interested in their produce more; we believe more
3	Canastota.....	1	During a portion of the season in the eastern part of the State. Think not; do not know of any.	1	stock up to the d forces it up by sufficient; it will not sell goes into be standard too ling purposes or at 4.5% I think
4	East Boston.....	1			often had it 5.5%; or inspector and any too high for ped; sometimes free from acids
5	Hamilton.....				is sour enough it to the higher
6	Lebanon... ..	1	In my own orchard.....	1	a juice, but can deal add, will do watered stock.
7	Oncida Valley	1	We have never found any.	1	
8	Morrisville Station				
9	Madison.....				
10	Canastota.....				
11	Chittenango.....	1	I have never found any.	1	

MADISON COUNTY — (Concluded).

Circular number.	POST-OFFICE	ANSWER		If so, where?	4%.	4%.	Remarks.
		Yes.	No.				
12	Chittenango.....	As to the percentage of acids I am not interested; the small mills are the ones affected adversely
13	Clockville.....	.....	.....	.....	1	.....
14	Erieville.....	.....	.....	.....	1	.....
15	Hobokenville.....	.....	1	"Ripened fruit" means something we seldom get in large lots of cider apples.	.....	.....
16	Peterboro.....	3	over. I have no means of testing.
17	Sheds.....	.....	.....	.....	1	.....
	South Hamilton.....	.....	.....	.....	.....	.....

The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been and is still being made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.

MONROE COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manufacture during one season?	Where do you get your cider or cider-vinegar stock?
		Yes.	No.			
1	Adams' Basin .....	.....	1	.....	.....	We make our cider from apples, and generally get 75 to 100 casks of second pressing each season, which we sell for vinegar stock.
2	Brockport	1	.....	This is my first year	2,500 barrels	Make it.
3	Clarkson	1	.....	7 years	200 casks	Make it.
4	Hamlin .....	.....	1	14 years	Made from 500 to 1,000 barrels of vinegar stock.	.....
5	Pittsford	1	.....	18 years	500 barrels	Make it.
6	Rochester	1	.....	20 years	1,000,000 gallons	New England and Middle States
7	Rochester .....	.....	1	.....	.....	.....
8	Rochester .....	.....	1	.....	.....	.....
9	Brighton	1	.....	14 years	500 gallons	Make it.
10	Charlotte .....	.....	1	.....	.....	.....
11	North Parma .....	.....	1	.....	.....	.....
12	Parma	1	.....	15 years	500 to 1,000 barrels	Make it.
13	Ensh .....	.....	1	.....	.....	.....
14	Union Hill	1	.....	14 years .....	.....	Make it.

MONROE COUNTY — (Continued).

Circular number.	POST-OFFICE	Where is the fruit grown from which the cider or stock you use is made?	Do you manufacture a uniform or a varying strength of vinegar as to acidity?	If uniform what is the percentage of the acidity?	If of a varying strength, A A A A acidity that you manufacture?		Do you have any difficulty in producing in pure cider vinegar 4.5% of acidity?	
			Uniform.	Varying.	Lowest.	Greatest.	Yes.	No.
1	Adams' Basin	Monroe county.....	.....	.....	.....	.....	.....	1
2	Brockport.....	Vicinity .....	.....	.....	.....	.....	.....	.....
3	Clarkson	Monroe county.....	1	.....	.....	.....	.....	1
4	Hamilin .....	.....	.....	.....	.....	.....	.....	.....
5	Pittsford	Monroe county.....	.....	1	30 grs.....	48 grs.....	1	.....
6	Rochester	New England and Middle States	.....	1	5	\$.9	.....	1
7	Rochester .....	.....	.....	.....	.....	.....	.....	.....
8	Rochester .....	.....	.....	.....	.....	.....	.....	.....
9	Brighton	Monroe county.....	.....	1	.....	.....	.....	.....
10	Charlotte.....	.....	.....	.....	.....	.....	.....	.....
11	North Parma.....	Clarkson .....	.....	.....	.....	.....	1	.....
12	Parma.....	Monroe county.....	.....	1	40	45	.....	1
13	Rush .....	.....	.....	.....	.....	.....	.....	.....
14	Union Hill.....	Vicinity .....	.....	.....	.....	.....	.....	1

MONROE COUNTY — (Continued).

Circular number.	POST-OFFICE.	Is there in this fruit containing 4.5 per cent of acetic acid?		If so, where?	4½.	46.	Remarks.
		Yes.	No.				
1	Adams' Basin .....	.....	1	.....	.....	.....
2	Brockport .....	.....	.....	.....	1	.....
3	Clarkson .....	.....	.....	.....	.....	.....
4	Hamlin .....	.....	.....	.....	1	.....
5	Pittsford .....	.....	1	Not unless the fruit is all early fruit.	.....	1	
6	Rochester .....	.....	1	Never found any	1	.....
7	Rochester .....	.....	.....	.....	.....	.....
8	Rochester .....	.....	.....	.....	.....	.....
9	Brighton .....	.....	.....	.....	.....	.....

The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been made and is still being made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.

MONROE COUNTY.— (Concluded).

Circular number.		If so, where?	4½%	4s.	Remarks.
			The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been and is still being made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.		
10	Charlotte.....	.....	.....	.....	I made from 400 to 1,700 barrels each year previous to the last five years, since which 20, and November older 24; in vicinity.
11	North Parma.....	.....	1	.....	I
12	Parma.....	.....	1	.....	If
13	Rush.....	.....	.....	1	I
14	Union Hill.....	.....	.....	.....	I of vinegar making; found he vinegar is the better the

MONTGOMERY COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manu- facture during one season?	Where do you get your cider or cider-vinegar stock?
		Yes.	No.			
1	Port Jackson	1	.....	17 years	100 barrels	Make it.
2	Ames.....	1	.....	Always	1,600 barrels.....	Make it.
3	Randall	1	.....	40 years	6,000 to 10,000 barrels.....	Make it.
4	St. Johnsville	1	.....	14 years .....	.....	Make it.

MONTGOMERY COUNTY — (Continued).

Circular number.	POST-OFFICE.	Where is the fruit grown from which the cider or stock you use is made?	Do you manufacture a uniform or a varying strength of vinegar as to acidity?		If uniform what is the percentage of the acidity?	If of a varying strength, what is the lowest and greatest percentage of acidity that you manufacture?		Do you have any difficulty in producing in pure cider vinegar 4.5% of acidity?	
			Uniform.	Varying.		Lowest.	Greatest.	Yes.	No.
1	Port Jackson.....	Towns of Amsterdam and Florida.	1	.....	.....	.....	.....	.....	1
2	Ames.....	Montgomery county	1	.....	.....	.....	.....	1	.....
3	Randall	Montgomery county .....	.....	1	.....	.....	.....	1	.....
4	St. Johnsville	Montgomery county .....	.....	1	.....	.....	.....	1	.....

MONTGOMERY COUNTY — (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	If so, what are those conditions?	Yes.	No.	If so, how?
1	Port Jackson .....	.....	1	We think not..... Rotten or very wormy fruit will not make as good vinegar as ripe fruit, it being of bad flavor and lacking acidity. Our way of making takes a long time.	.....	.....	..... Apples in the northern part of Herkimer county have very little taste to them.
2	Ames	1	.....		.....	.....
3	Randall .....	.....	.....	Our way of making takes a long time.	.....	.....	.....
4	St. Johnsville .....	.....	1		1	.....

MONTGOMERY COUNTY --- (Concluded).

Circular number.	POST-OFFICE.	Is there in this fruit w containing 4.5 per cent of acetic acid?		If so, where?	4½%.	4%.	Remarks.
		Yes.	No.				
1	Port Jackson.....	.....	1	Do not think there is...	.....	1	We have never used a tester; we think that 4 per cent of acetic acid is strong enough
2	Ames.....	1	.....	The northern counties produce poor fruit.	.....	.....	acquired which does not have the acid of that which a nail will get into a barrel and spoil it, making it flat
3	Randall .....	.....	.....	.....	.....	.....	and almost impossible.
4	St. Johnsville.....	.....	.....	.....	.....	1	We think 4 per cent would be a great plenty.

NEW YORK COUNTY.

Circuler number	POST-OFFICE	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manufacture during one season?	Where do you get your cider or cider-vinegar stock?
		Yes.	No.			
1	New York.....	.....	1	Have sold cider vinegar since the new law went into effect; sell large quantities of cider vinegar, and consider ourselves well informed and thoroughly familiar with the process of manufacturing	Sell from 4,000 to 5,000 barrels per year.	New York, New Jersey, Connecticut, Pennsylvania and Massachusetts.
2	New York.....	.....	1	.....	.....	We purchase our cider vinegar of Harrison & Co., or Genesee Fruit Co., New York city. Anywhere.
3	New York.....	.....	1	.....	Only a dealer.....	.....
4	New York.....	.....	1	.....	.....	.....
5	New York.....	1	.....	4 years	In New York city, 1,500 barrels; other places 40,000 to 50,000 barrels.	New York State
6	New York.....	1	.....	20 years .....	.....	.....
7	New York.....	.....	1	24 years	300 barrels.....	.....
8	New York.....	.....	1	.....	.....	.....

New York County — (Concluded).

L		S		Yes.	No.	If so, where?	1/4	4.	Remarks.
POST-OFFICE.		S							
1	New York.....	.....	.....	.....	.....	.....	1	.....	It being the desire of the people who c in the present law protected, do not enough for household he can add a little water, which will have the desired effect, without increasing the cost; it is a fact that all vinegar stock will produce more than 4 5% acidity and more than 9% solids, thus permitting the manufacturer to reduce these and still comply with the law; it is plain to be seen that any change in the law would be an injustice to consumers.
2	New York.....	.....	.....	.....	.....	.....	1	.....	We do not recommend a change from 4.5% to 4% either in cider or white wine vinegar, and prefer to have the law remain as it is; as far as we are practical manufacturers we would have no trouble to produce 4.5% older vinegar at all times of the year; the reason we do not manufacture pure older vinegar is because far higher here than in the country and, consequently, the country can produce cheaper cider vinegar than we can.
3	New York.....	.....	.....	.....	.....	.....	1	.....	Vinegar, if produced in the natural way, can never be too strong.
4	New York.....	.....	.....	.....	.....	.....	1	.....	I manufactured white wine vinegar for twenty-two years, but gave up the business because the standard is not low enough and am of the opinion that all vinegar should be made, as a 4% vinegar is as suitable for general purposes as a 4.5%, and the present law throws the control of the market, almost exclusively, into the hands of the large mills.
5	New York	1	.....	Hudson valley fruit will not produce 4.5% acetic acid except under the most favorable circumstances.	.....	.....	1	.....
6	New York.....	.....	1	.....	.....	.....	1	.....
7	New York.....	.....	.....	.....	.....	.....	.....	.....
8	New York .....	.....	.....	.....	.....	.....	1	.....

NIAGARA COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manufacture during one season?	Where do you get your cider or cider-vinegar stock?
		Yes.	No.			
1	Gasport	1	.....	Since 1848	3,000 gallons.....	From hard cider and the refuse of refined cider.
2	Johnson's Creek.....	.....	1	25 years .....	.....	.....
3	La Salle .....	.....	1	.....	.....	.....
4	Lockport	1	.....	1 year	300 barrels.....	Make it.
5	Lockport	1	.....	8 years	2,000 barrels.....	Make it.
6	Middleport	1	.....	10 years	50 casks	Make it.
7	Royalton Center.....	1	.....	8 years .....	.....	.....
8	Sanborn. ....	.....	1	.....	.....	.....
9	Somerset	1	.....	15 years	75 to 200 barrels	Make it.
10	Suspension Bridge .....	.....	1	.....	.....	.....
11	Reynale's Basin.....	1	.....	Since 1849	10 to 50 barrels	Make it.
12	Lewiston	1	.....	.....	.....	.....
13	North Ridge.....	1	.....	20 years	1 to 5 barrels	Make it.
14	Ransomville.....	1	.....	Always	1 to 5 barrels	Make it.
15	Wright's Corners.....	1	.....	30 years	5 to 30 barrels	Make it.
16	Somerset .....	.....	1	25 years	100 barrels.....	Make it.

NIAGARA COUNTY — (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		If so, what are those conditions?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	Yes.	No.	Yes.	No.	Yes.	No.
1	Gaspott.....	1	1	1	1	1	1	1	1
2	Johnson's Creek.....	1	1	1	1	1	1	1	1
3	La Salle.....	1	1	1	1	1	1	1	1
4	Lockport.....	1	1	1	1	1	1	1	1
5	Lockport.....	1	1	1	1	1	1	1	1
6	Middleport.....	1	1	1	1	1	1	1	1
7	Royalton Center.....	1	1	1	1	1	1	1	1
8	Sanborn.....	1	1	1	1	1	1	1	1
9	Somerset.....	1	1	1	1	1	1	1	1
10	Suspension Bridge.....	1	1	1	1	1	1	1	1
11	Reynolds's Basin.....	1	1	1	1	1	1	1	1
12	Lewiston.....	1	1	1	1	1	1	1	1
13	North Ridge.....	1	1	1	1	1	1	1	1
14	Ransomville.....	1	1	1	1	1	1	1	1

NIAGARA COUNTY — (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	If so, what are those conditions?	Yes.	No.	If so, how?
15	Wright's Corners.....	1	.....	Rotten or specked apples.....	1	.....	.....
16	Somerset .....	.....	1	Fruit should be ripe to make good cider, and the better the older is the better the vinegar will be.	.....	.....	.....

NIAGARA COUNTY — (Continued).

Circular number.	POST-OFFICE.	Is containing 4.5 per cent of acetic acid?		If so, where?	The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been and is still being made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.		Remarks.
		Yes.	No.		4½.	4%.	
1	Gaspert .....	....	....	....	1	....
2	Johnson's Creek....	....	....	....	1	....
3	La Salle .....	....	....	....	....	1	
4	Lockport	1	....	We think not.....	1	....
5	Lockport .....	....	1	We have never found such a section.	1	....
6	Middleport .....	....	....	....	1	....
7	Royalton Center....	....	....	....	....	....
8	Sanborn .....	....	....	....	1	....
9	Somerset	1	....	Where it is nearly all grafted fruit; natural fruit makes better cider than grafted fruit.	....	1	
10	Suspension Bridge..	....	1	Think not	1	....	1
11	Reynolds's Basin....	....	1	Think not, if cider is made in the proper season.	1	....	1

for the past five years; the standard should not be lowered
to make it that strength if ripe fruit is used; I find that
will not make as good cider vinegar as that made after
vinegar, and putting it on the market, containing less than

NIAGARA COUNTY — (Concluded).

Circular number.	POST-OFFICE.	Is it in fruit containing 4.5 per cent of acetic acid?			The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been and is still being made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.			Remarks.
		Yes.	No.	If so, where?		4½%.	4%.	
12	Lewiston .....	....	....	.....	....	....	....	Large quantities of cider, and let
13	North Ridge .....	....	....	.....	....	....	....	be in the vicinity.
14	Ransomville .....	....	1	.....	1	....	....	the vinegar I see made from
15	Wright's Corners .....	....	1	I do not believe there is, anywhere.	1	....	....	use; the juice, when one year
16	Somerset .....	....	....	.....	....	....	....	later
								able making vinegar from cider
								taking vinegar
								my customers complain if it is
								vinegar law went into effect; I
								ever made was allowing it to

MADE IN CANADA.

FRANK H. TAYLOR.

ONEIDA COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar ?		How long have you been such ?	How much do you manu- facture during one season ?	Where do you get your cider or cider-vinegar stock ?
		Yes.	No.			
1	Clinton	1	.....	20 years	1,000 barrels.....	Make it.
2	Deansville.....	1	.....	6 years	1,000 barrels.....	Make it.
3	Durhamville ...	1	.....	20 years	20 to 50 barrels	Make it.
4	Florence	1	.....	10 years	1,500 gallons.....	Vicinity.
5	New Hartford.....	1	.....	18 years	800 to 1,000 casks.....	Make it.
6	New Hartford.....	1	.....	30 years	100 casks	Make it.
7	Rome	1	.....	20 years	1 to 10 casks.....	Make it.
8	Trenton	1	.....	25 years	25 to 100 barrels	Make it.
9	Verona	1	.....	15 years	400 to 500 barrels	From apples and pomace.
10	Westernville	1	.....	12 years	600 gallons	Own orchard.
11	Deansville.....	1	.....	20 years	2 to 8 barrels	Make it.
12	Holland Patent	1	.....	20 years	1 to 4 barrels	Make it.
13	Rome	1	.....	7 years	20 to 50 barrels	Make it.
14	Stockwell	1	.....	.....	.....	Make it.
15	Utica.....	1	.....	5 years	150 to 300 barrels	Buy it in different parts of the State.
16	Vernon.....	1	.....	15 years	30 barrels	Make it.

ONEIDA COUNTY — (Continued).

(Circular number.)	POST-OFFICE.	Where is the fruit grown from which the cider or stock you use is made?	Do you manufacture a uniform or a varying strength of vinegar as to acidity?		If uniform what is the percentage of the acidity?	If of a varying strength, what is the lowest and greatest percentage of acidity that you manufacture?		Do you have any difficulty in producing in pure cider vinegar 4.5% of acidity?	
			Uniform.	Varying.		Lowest.	Greatest.	Yes.	No.
1	Clinton	New York State.....	1	.....	4.5 to 5	.....	.....	1	.....
2	Deansville	Oneida, Saratoga, Lewis and Schoharie counties.	.....	1	.. .....	4.5	5.5	1	.....
3	Durhamville	Oneida and Madison counties..	1	.....	5	.....	.....	1	.....
4	Florence	Vicinity	1	.....	.....	.....	.....	1	.....
5	New Hartford.....	Vicinity; have brought apples here, in short years, from Michigan, Pennsylvania and Western and Northern New York.	1	.....	5	.....	.....	.....	1
6	New Hartford.....	Vicinity	1	.....	4.5	.....	.....	.....	1
7	Rome.....	Vicinity .....	.....	1	.....	.....	.....	.....	.....
8	Trenton	Mostly from town of Trenton; some from towns of Steuben and Remsen.	1	.....	4	.....	.....	1	.....
9	Verona	New York State, and, sometimes, Michigan.	.....	1	.....	4	4.5	.....	1
10	Westernville	Vicinity .....	.....	.....	.....	.....	.....	.....	.....
11	Deansville	Vicinity .....	.....	.....	.....	.....	.....	.....	.....
12	Holland Patent.....	Oneida and Herkimer counties.	.....	.....	.....	.....	.....	.....	.....
13	Rome.....	Stillville and Holland Patent..	.....	1	.....	4.5	5	.....	1
14	Stockwell	Vicinity .....	.....	.....	.....	.....	.....	.....	.....
15	Utica	Mostly in New York State.....	1	.....	40 gr.	.....	.....	.....	1
16	Vernon	Oneida and Madison counties..	1	.....	.....	.....	.....	.....	.....

ONEIDA COUNTY — (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	Yes.	No.	Yes.	No.
1	Clinton	1	.....	.....	.....	.....	1
2	Deansville	1	.....	1	.....	1	.....
3	Durhamville	1	.....	1	.....	.....	1
4	Florence .....	.....	.....	.....	.....	.....	.....
5	New Hartford .....	.....	.....	1	.....	.....	1
6	New Hartford .....	.....	1	1	.....	1	.....
7	Rome .....	.....	.....	.....	.....	.....	.....
8	Trenton .....	.....	.....	.....	.....	.....	.....
9	Verona .....	.....	1	1	.....	.....	.....
10	Westernville .....	.....	.....	.....	.....	.....	.....
11	Deansville .....	.....	.....	.....	.....	.....	.....
12	Holland Patent .....	.....	.....	.....	.....	.....	.....
13	Rome .....	.....	1	.....	.....	.....	1
14	Stockwell .....	.....	.....	.....	.....	.....	.....
15	Utica .....	.....	.....	.....	.....	.....	.....
16	Vernon .....	.....	.....	.....	.....	.....	.....

ONEIDA COUNTY — (Concluded).

POST-OFFICE.		Is there any apple-growing section in this State where the ripened fruit will not produce a vinegar containing 4.5 per cent of acetic acid?		If so, where?		4365	46.	Remarks.
Yes.	No.							
1	1	.....	We have found no such place.		1	.....	The law as now in force is good enough; if any alterations are made there will be a loophole for trouble. It makes no difference to us whether 4.5 or 4.8% acetic acid; we do not favor reducing the acid; we have made vinegar 8% acids and 4.7% acetic acid; the generator makes a great difference; a reduction would use up early apples and benefit both farmer and manufacturer. Keep the standard up to 4.5%, so that nothing but ripe apples can be used; windfalls, worms and rotten apples bring the complaint, and should be kept out; farmers who have such want to use it, and doctor it up for vinegar, and spoil the market for a good article.
2	1	.....	We know of none.		.....	.....
3	1	.....	.....		1	.....
4	1	.....	Not that I know of.		.....	.....	The standard should remain at 4.5% acetic acid; when consumers complain that the standard is too high, then is time enough to reduce it; with reasonable time and care either any season will make vinegar above the standard. Am opposed to such change; the standard is none too high, and does not exceed one-seventh of pure acetic acid; the statute prescribes a penalty against watering milk; are not the cases too near alike for the favoritism asked for.
5	1	.....	No not think there is.		1	.....
6	1	.....	Know of none; if there be such the cause will be owing to the mode of handling.		1	.....
7	except by taste; formerly made 40 to 50 barrels, but vinegar at 1 now will not sell and make vinegar of that which is too wet; would please the people better than stronger, speak-
8	1	.....	In this vicinity		.....	1	Think the standard too high; a 5% would be strong enough for ordinary use; have no modern facilities for the manufacture of vinegar; let it stand in casks, drawing from one to the other, and give it age, which shows high standard in solids and low in acetic acid.
9	1	Think it should be changed; if vinegar contained 4% acetic acid it would be plenty strong enough, and there would be no complaint.
10	We make older and let it go into vinegar; it makes quicker in molasses barrels; we gather our winter fruit, and then we gather the rest and take them to mill.
11		1	.....	From what I know of manufactured vinegar it is poor enough now without making it any weaker.
12		1	.....	Altogether persons have nothing to fear from 4.5%; there are too many unprincipled men making vinegar out of pulp that has been repressed and watered, which is of very little value.

13	Rome.....	1	Do not think there is if the fruit is properly handled.	1	The standard should not be reduced.
14	Stockwell .....	.....	.....	.....	I have a large cistern in engine room, and fill it in the fall; in two or three months it will be vinegar; I have no instruments to test it.
15	Utica .....	.....	.....	.....	Do not have any trouble in producing good cider vinegar.
16	Vernon .....	.....	.....	.....	Do not care as regards the change.

ONONDAGA COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manufacture during one season?	Where do you get your cider or cider-vinegar stock?
		Yes.	No.			
1	Baldwinsville.....	1	.....	9 years	25 to 50 barrels	Make it.
2	Baldwinsville.....	.....	1	Went out of business nine years ago.	.....	.....
3	Baldwinsville.....	.....	1	Am not manufacturing at present.	.....	Made it.
4	Elbridge.....	.....	1	50 years	25 to 50 barrels	Make it.
5	Euclid .....	.....	1	.....	.....	.....
6	DeWitt	1	.....	20 years	800 45-gallon casks.....	Make it.
7	Memphis .....	.....	1	.....	.....	Made it.
8	Onondaga Valley .....	.....	1	10 years .....	.....	Made it.
9	Onondaga Valley.....	.....	1	20 years .....	.....	Made it.
10	Syracuse .....	.....	1	.....	.....	.....
11	Jordan	1	.....	20 years	10 to 12 barrels	Make it.
12	Kirkville	1	.....	8 years	50 to 60 barrels	Make it.
13	Marcellus	1	.....	20 years	25 barrels.....	Make it.
14	Onondaga Hill	1	.....	17 years	40 to 50 barrels	Make it.
15	Richmond Mills	1	.....	3 years .....	.....	Make it.
16	Skaneateles	1	.....	25 years	100 to 200 barrels.....	Make it.

ONONDAGA COUNTY — (Continued).

Circular number.	POST-OFFICE.	Where is the fruit grown from which the cider or stock you use is made?	Do you manufacture or a varying strength of vinegar as to acidity?		If uniform what is the percentage of the acidity?	If of a varying strength, what is the lowest and greatest percentage of acidity that you manufacture?		Do you have any difficulty in producing in pure cider vinegar 4.5% of acidity?	
			Uniform.	Varying.		Lowest.	Greatest.	Yes.	No.
1	Baldwinsville.....	Towns of Van Buren and Lynders.	.....	.....	.....	.....	.....	.....	1
2	Baldwinsville.....	.....	.....	.....	.....	.....	.....	.....	.....
3	Baldwinsville.....	Onondaga county.....	.....	1	.....	4.5	4.6	1	.....
4	Elbridge.....	Western part of Onondaga county.	1	.....	.....	.....	.....	.....	1
5	Euclid.....	.....	.....	.....	.....	.....	.....	.....	.....
6	DeWitt.....	.....	.....	1	.....	4.25	6	.....	1
7	Memphis.....	.....	.....	1	.....	.....	.....	.....	1
8	Onondaga Valley.....	.....	.....	1	.....	5.5	4.5	1	.....
9	Onondaga Valley.....	..... and Marcellus.	1	.....	4	.....	.....	1	.....
10	Syracuse.....	.....	.....	.....	.....	.....	.....	.....	.....
11	Jordan.....	Onondaga and Cayuga counties	.....	.....	.....	.....	.....	.....	1
12	Kirkville.....	Vicinity.....	.....	1	.....	.....	.....	1	.....
13	Marcellus.....	Vicinity.....	.....	.....	.....	.....	.....	.....	.....
14	Onondaga Hill.....	Onondaga county.....	.....	.....	.....	.....	.....	.....	.....
15	Richmond Mills.....	Vicinity.....	.....	.....	.....	.....	.....	.....	.....
16	Shanestates.....	Vicinity.....	.....	1	.....	3.5	6	.....	1

ONONDAGA COUNTY—(Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the to do with they will		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	If so, what are those conditions?	Yes.	No.	If so, how?
1	Baldwinsville						
2	Baldwinsville						
3	Baldwinsville	1		Early unripened fruit.			
4	Elbridge			Heat and cold have much to do with it; do not think the fruit juice has much to do with it.	1		Partially ripe, comes acid change in no high tempers
5	Excelld						
6	De Witt		1	Very little; if any, from August apples; otherwise, not any in making 4.5% by mixing stock of the same season together.	1		Early apples 1 juice; cider maturing in 1 only 18 whi. test from 24 meter.
7	Memphis				1		Ripe, sound fr for vinegar: season will cider than a wet one, but not so much.
8	Onondaga Valley	1		Cider made from early apples and kept in open tanks. It was hard to get over 4% without use of drugs.	1		Late, ripe apples are best....
9	Onondaga Valley						
10	Syracuse						
11	Jordan		1	Give it plenty of time.	1		The later the fruit the better the cider.
12	Kirkville	1		It is difficult with early fruit, as it does not contain sugar enough.	1		Think latest apples give best results in regard to acetic acid.
13	Marcellus				1		Late cider makes the strongest vinegar.
14	Onondaga Hill						
15	Richmond Mills						
16	Skaneateles		1	Insufficient heat in cellar to produce proper acidity; time will produce 4.5% acetic acid.	1		Early apples are not as good as later fruit in the fall.

ONONDAGA COUNTY -- (Continued).

Circular number.	POST-OFFICE.	Acid ?			If so, where ?	4½%.	4%.	Remarks.
		Yes.	No.					
1	Baldwinsville.....	.....	.....	.....	.....	1	1	Do not favor a change; vinegar cannot be too good; make any vinegar by letting it stand; it takes from year to a year and a half to make pure cider vinegar by doing that way.
2	Baldwinsville.....	.....	.....	.....	.....	1	1	
3	Baldwinsville.....	.....	.....	.....	.....	.....	1	
4	Elbridge.....	.....	1	.....	Think not.....	1	1	
5	Euclid.....	.....	.....	.....	.....	1	1	
6	DeWitt.....	.....	1	.....	Think not.....	1	1	
7	Memphis.....	.....	.....	.....	.....	.....	.....
8	Onondaga Valley....	1	.....	.....	Early windfalls, from September fifteenth to October tenth, though apparently ripe, will not make 4.5% vinegar as made in my old fashioned way.....	.....	.....
9	Onondaga Valley....	1	.....	.....	Think it is very hard to get 4.5% in this State..	.....	1	it to be reduced; it is well enough to have a standard, but it that vinegar cannot be made out of good pure cider; drugs
10	Syracuse.....	.....	.....	.....	.....	1	.....	The standard should not be below more certainly give the consumer a good vinegar and to shut out an of the same.
11	Jordan.....	.....	.....	.....	.....	.....	.....	I have never tested my vinegar, or in any nothing regarding the present law.
12	Kirkville.....	.....	.....	.....	.....	.....	.....	Vinegar of 4% acetic acid can easily be manufactured from pure cider; cider intended for vinegar should not be made too fast.

The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been and is still being made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.

ONONDAGA COUNTY — (Concluded).

Circular number.	POST-OFFICE.	Is			The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.	Remarks.	
		Yes.	No.	If so, where?			
13	Marcellus	4 1/4%	4%	We have never tested our vinegar. I never have tested my vinegar, but, judging from those who have tested it, I think the standard should not be reduced. I run a custom cider mill; cider, which I retail to customers; I have never not know its strength. per standard is uncalled
14	Onondaga Hill.....	.....	.....	.....	1	.....
15	Richmond Mills.....	.....	.....	.....	.....	.....
16	Granesteele.....	.....	.....	.....	1	.....

ONTARIO COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar ?		How long have you been such ?	How much do you manufacture during one season ?	Where do you get your cider or cider-vinegar stock ?
		Yes.	No.			
1	Allen's Hill.....	1	.....	12 years	50 barrels.....	Make it.
2	Manchester	1	.....	30 years	20 to 50 barrels	Make it.
3	North Bloomfield	1	.....	48 years	20 to 80 casks.....	Make it.
4	Oak's Corners.....	1	.....	15 years	100 casks.....	Make it.
5	Phelps.....	.....	1	In 1881 and 1882.....	.....	Town of Phelps.
6	Shortsville	1	.....	15 years	6,000 gallons.....	Make it.
7	Shortsville. ....	.....	1	.....	.....	.....
8	Victor	1	.....	9 years	1,000 to 2,000 gallons.....	Make it.
9	Farmington	1	.....	8 years	10 barrels.....	Make it.
10	South Bristol	1	.....	8 years .....	.....	Make it.

ONTARIO COUNTY — (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the to do with they will		Will apples grown in different parts of the State vary in the amount of acid sold they will produce?	
		Yes.	No.	Yes.	No.	Yes.	No.
1	Allen's Hill	1	....	1	....	....	....
2	Manchester .....	....	....	....	....	....	....
3	North Bloomfield	1	....	1	....	1	....
4	Oak's Owners .....	....	....	....	....	....	....
5	Phelps .....	....	....	1	....	....	....
6	Shortsville	1	....	1	....	1	....
7	Shortsville .....	....	....	1	....	....	....
8	Victor .....	....	....	1	....	....	....
9	Farmington .....	....	....	1	....	....	....
10	South Bristol .....	....	....	....	....	....	....

If so, how?

If so, what?

If so, what are those conditions?

According to the nature of the soil; if wet the apples will contain less sugar and, therefore, less acid.

The best fruit section produces the best vinegar: early apples or windfalls will test 12 to 15 by hydrometer, while well-matured fruit will test, at least, 25.

Do not think there is any difference, the fruit being the same.

The later ripening retain the greater per cent of sugar.

Early fruit will make vinegar sooner than late fruit.

They should ripen late in the fall.

ONTARIO COUNTY—(Concluded).

Circular number.	POST-OFFICE.	Answers.			Remarks.
		Yes.	No.	If so, where?	
					The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been and is still being made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.
1	Allen's Hill.....	....	....	....	1 I favor the change, as it is difficult to make 4.5% from early fruit, and the rich cider of late, well-matured apples, if made by the self-made process of small manufacturers and farmers, takes too long time.
2	Manchester.....	....	....	....	1 If the standard is to be changed, make it more, not less, unless more adulterated goods are wanted on the market.
3	North Bloomfield ..	1	....	I know I cannot do it all the time.	1 I am not impelling me to make what I do not the farmer from selling his product in vinegar makers.
4	Oak's Corners.....	....	....	....	1 Think we need pure cider vinegar and of good strength; there is too much poor goods sold.
5	Phelps.....	....	....	....	1 Think 4% vinegar is pleasanter; I had no difficulty in making a good, strong, sharp vinegar by adding corn-meal mush, four to six quarts to a barrel of cider.
6	Shortsville .....	....	....	....	1 I favor 4% for the reason that half the apples in a year will not come up to the standard without more time for evaporation.
7	Shortsville .....	....	....	....	I believe there are too many cider makers in the country who do not know how to make good cider; one can no more make a good quality of vinegar from poor cider than he can make good maple sugar from sour sap.
8	Victor .....	....	....	....	I put my cider in tanks, holding seventy to eighty barrels each, and let it stand and work into vinegar the old-fashioned way; think this the best, no acid vinegar for me.
9	Farmington.....	....	....	....	1 Vinegar that is not up to the standard, as at present, should not be allowed for sale in the market; it is nothing but acid vinegar, and not fit for use.
10	South Bristol.....	....	....	....	.... Having no means of testing my vinegar I know nothing about its strength.

ORANGE COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar ?		How long have you been such ?	How much do you manufacture during one season ?	Where do you get your cider or cider-vinegar stock ?
		Yes.	No.			
1	Florida	1	.....	5 years	400 to 500 gallons	Make it.
2	Newburgh	1	.....	12 years	150 to 200 barrels	Vicinity.
3	Mountainville	1	.....	15 years	5,000 to 10,000 bushels apples	Make it.
4	Mountainville	1	.....	18 years	100 to 400 gallons	On my farm.
5	Tri States	1	.....	20 years	10 barrels	Orange county, N. Y., and Sussex county, N. J.
6	Warwick .....	.....	1	.....	.....	.....
7	Chester	1	.....	7 years	5,000 gallons	Make it.
8	Joshua	1	.....	7 years	5,000 gallons	Make it.
9	Washingtonville	1	.....	8 years	300 to 500 gallons	Vicinity.

ORANGE COUNTY — (Continued).

Circular number.	POST-OFFICE.	Where is the fruit grown from which the cider or stock you use is made?	Do you manufacture a uniform strength of vinegar as to acidity?		If uniform what is the percentage of the acidity?	If of a varying strength, lowest and greatest?		Do you have any difficulty in producing in pure cider vinegar 4.5 of acidity?	
			Uniform.	Varying.		Lowest.	Greatest.	Yes.	No.
1	Florida	Florida, Orange county .....	.....	1	.....	.....	.....	1	.....
2	Newburgh.....	Vicinity .....	.....	1	.....	3.2	6.7	.....	1
3	Mountainville	Orange county	1	.....	.....	.....	.....	.....	.....
4	Mountainville	On my farm.....	.....	1	.....	.....	.....	1	.....
5	Tri States	Orange county, N. Y., and Sussex county, N. J.....	.....	.....	.....	.....	.....	.....	.....
6	Warwick .....	.....	.....	.....	.....	.....	.....	.....	.....
7	Chester.....	Towns of Chester and Bloomington	1	.....	5	.....	.....	.....	1
8	Gosben	Orange county	1	.....	4.5	.....	.....	.....	1
9	Washingtonville.....	Vicinity	1	.....	4.5	.....	.....	.....	1

ORANGE COUNTY — (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		If so, what are those conditions?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	Yes.	No.	Yes.	No.	Yes.	No.
1	Florida					1			
2	Newburgh		1	Not if we wait long enough.				1	
3	Mountainville					1			
4	Mountainville	1		Early-made cider (September) takes longer to make vinegar, and then it is not the equal of late-made in quality or flavor.		1			Cider from some sections is heavier than from others, and contains more sugar.
5	Tri States			Our natural fruit makes the best and richest cider.				1	Early apples make vinegar sooner than late ones.
6	Warwick								
7	Chester					1			
8	Goshen					1			
9	Washingtonville					1			

ORANGE COUNTY — (Concluded).

Circular number.	POST-OFFICE.	Is there any apple-growing section in this State where the ripened fruit will not produce a vinegar containing 4.5 per cent of acetic acid?			The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been and is still being made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.	
		Yes.	No.	If so, where?	4½%	4%.
1	Florida .....	.....	.....	.....	.....	1
2	Newburgh. ....	.....	.....	.....	.....	1
3	Mountainville .....	.....	.....	.....	.....	1
4	Mountainville .....	.....	.....	.....	.....	.....
5	Tri States .....	.....	.....	.....	.....	.....
6	Warwick .....	.....	.....	.....	1	.....
7	Chester. ....	.....	.....	.....	1	.....
8	Goshen .....	.....	.....	.....	1	.....
9	Washingtonville. ....	.....	.....	.....	1	.....

ORLEANS COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manu- facture during one season?	Where do you get your cider or cider-vinegar stock?
		Yes.	No.			
1	Albion.....	1	.....	4 years	7,000 barrels.....	Made by us, mostly.
2	Barre Center	1	.....	21 years	200 barrels.....	Make it out of second pressings.
3	Gaines.....	.....	1	.....	.....	.....
4	Holley.....	1	.....	18 years	15,000 to 25,000 barrels.....	From Maine to Missouri.
5	Hulburton.....	.....	1	10 years	900 barrels.....	Made it.
6	Albion.....	.....	1	12 years	Made 1,000 barrels.....	Made it.
7	Clarendon	1	.....	4 years	75 barrels.....	Make it.
8	Jeddo	1	.....	20 years	20 barrels.....	Make it.
9	Millville	1	.....	30 years .....	.. ..	Make it.
10	Ridgeway	1	.....	19 years	20 to 30 barrels	Make it.

ORLEANS COUNTY — (Continued).

Circular number.	POST-OFFICE	Where is the fruit grown from which the cider or stock you use is made?	Do you manufacture a uniform or a varying strength of vinegar as to acidity?		If uniform what is the percentage of the acidity?	If of a varying strength, what is the lowest and greatest percentage of acidity that you manufacture?		Do you have any difficulty in producing in pure older vinegar 4.5% of acidity?	
			Uniform.	Varying.		Lowest.	Greatest.	Yes.	No.
1	Albion	Western New York and Hudson Valley.	1	.....	5.5	.....	.....	.....	1
2	Barre Center	Vicinity .....	.....	1	.....	3	6	.....	1
3	Gaines .....	.....	.....	.....	.....	.....	.....	.....	.....
4	Holley	All sections .....	.....	1	.....	5	6.5	.....	1
5	Hulburton	Orleans county .....	.....	.....	.....	.....	.....	.....	1
6	Albion	Orleans county .....	.....	1	.....	4.5	5	.....	1
7	Clarendon	Vicinity .....	.....	1	.....	4	5	.....	1
8	Jeddo	Niagara and Orleans counties..	.....	1	.....	*40	*53	1	.....
9	Millville	Vicinity .....	.....	1	.....	.....	.....	.....	.....
10	Ridgeway	Orleans county .....	.....	.....	.....	.....	.....	.....	.....

* This is undoubtedly an error

ORLEANS COUNTY—(Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit at the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	Yes.	No.	Yes.	No.
1	Albion .....	.....	1	1	.....	.....	1
2	Barre Center	1	.....	1	.....	.....	.....
3	Gaines .....	.....	.....	.....	.....	.....	.....
4	Botey .....	.....	1	1	.....	.....	1
5	Hulburton .....	.....	1	.....	.....	.....	.....
6	Albion .....	.....	1	.....	.....	.....	.....
7	Clarendon	1	.....	.....	.....	.....	.....
8	Jeddo .....	.....	1	1	.....	.....	.....
9	Millville .....	.....	.....	1	.....	.....	.....
10	Ridgeway .....	.....	.....	.....	.....	.....	.....

Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?

If so, how?

Think not.

Apples make the w
quent
hol an
We hav
any difference.

Late apples will produce the
high
but a
duce.
The lat

Cider made in hot weather is
more in volume and con-
tains less alcohol than cider
made in cold weather.

Summer and early fall apples
do not contain the sugar
that late fruit does.

Early apples make poor vine-
gar.
Early fall apples do not make
strong cider; natural fruit
cider is not as heavy as
grafted fruit.

ORLEANS COUNTY — (Concluded).

Circular number.	POST-OFFICE.	Is there any apple-growing section in this State where the ripened fruit will not produce a vinegar containing 4.5 per cent of acetic acid?			The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been and is still being made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.		
		Yes.	No.	If so, where?	4½%.	4%.	Remarks.
1	Albion.....	1	Think not.....	1	We are in favor of leaving the law as it is; we cannot see the policy of allowing the dealer to water sufficiently to reduce it to 4%; the consumer can, if he wishes, make it weaker very easily. The present standard should be maintained; we use the poorest quality of cider now. Do not think there should be any difficulty in making 4 5% vinegar if a person is expert and understands his business We are opposed to a reduction; the present law has greatly benefited the cider vinegar industry in this State, and given to it a reputation extending all over the country second to none; first pressing cider, any time of the year, will make 4.5% vinegar. It makes no difference whether pure cider vinegar contains 4% or 4.5% acetic acid; the principal object is to bring the pure article before the people; the intention of the law is that none but pure cider vinegar shall be exposed for sale. If I was manufacturing vinegar I should be opposed to the change, and do not think it to the interest of New York vinegar makers to lower it; the apples of this State are the richest of most any State in the Union. I think the standard too high; it effects those who do not use acids to bring it up to the standard. We think it would be better to change the standard; we have no trouble in making vinegar from grafted fruit; natural fruit cider has to be mixed to make standard. It should be changed to 4%; the standard should be low enough that vinegar made by quick process, from fall apples, would come up to it.
2	Barre Centre.....	1	....	.....	1	....
3	Gaines.....	....	....	.....	1	....
4	Holley.....	....	1	None that we ever found	1	....
5	Hulburton.....	....	....	.....	....	....
6	Albion.....	....	....	.....	1	....
7	Clarendon.....	....	....	.....	....	1
8	Jeddo.....	....	....	.....	....	1
9	Millville.....	....	....	.....	....	1
10	Ridgeway.....	....	....	.....	....	....

OSWEGO COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar ?		How long have you been such ?	How much do you manufacture during one season ?	Where do you get your cider or cider-vinegar stock ?
		Yes.	No.			
1	Amboy Center.....	.....	1	.....	.....	.....
2	Fulton.....	1	.....	.....	.....	.....
3	Hannibal.....	1	.....	.....	.....	.....
4	Hastings.....	1	.....	.....	.....	.....
5	Lansing.....	1	.....	20 years.....	500 to 25,000 gallons; usually the smaller amount.	Make it.....
6	Mexico.....	1	.....	20 years.....	75 barrels.....	Make it.....
7	Minetto.....	.....	.....	.....	.....	.....
8	New Haven.....	1	.....	20 years.....	20 to 100 casks.....	Make it.....
9	Oswego.....	1	.....	30 years.....	1,200 to 2,000 barrels.....	Make it.....
10	Phoenix.....	.....	1	4 years.....	.....	.....
11	North Hannibal.....	1	.....	4 years.....	100 barrels.....	Make it.....
12	Phoenix.....	.....	1	.....	.....	Make it.....
13	Oswego Center.....	1	.....	20 years.....	200 to 400 barrels.....	Make it.....
14	Central Square.....	1	.....	2 years.....	.....	Make it.....
15	Pennellville.....	1	.....	5 years.....	50 casks.....	Make it.....
16	Volney.....	1	.....	20 years.....	10 casks.....	Make it.....

OSWEGO COUNTY — (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	If so, what are those conditions?	Yes.	No.	If so, how?
1	Unboy Center.....	.....	.....	.....	.....	.....	.....
2	Fulton.....	.....	.....	.....	.....	.....	.....
3	Hannibal.....	.....	.....	.....	.....	.....	.....
4	Hastings.....	.....	.....	.....	.....	.....	.....
5	Lansing.....	.....	1	Unripe, frost-bitten or immature fruit; think there is no difficulty if the fruit is not frozen or decayed.	1	.....	.....
6	Mexico.....	.....	.....	.....	1	.....	.....
7	Minetto.....	.....	.....	.....	.....	.....	.....
8	New Haven.....	.....	1	Think not.....	1	.....	.....
9	Oswego.....	1	.....	Early apples do not make as heavy juice as late winter apples.	1	.....	We have heard that apples grown in the eastern part of this State would.
10	Phoenix.....	.....	.....	.....	.....	.....	.....
11	North Hannibal.....	1	.....	It does with time of turning to vinegar; earliest turn soonest.	.....	.....	.....
12	Phoenix.....	.....	.....	.....	.....	.....	.....
13	Oswego Center.....	1	.....	Late ripened fruit will make much better vinegar than early fruit.	1	.....	I have been told that apples grown in the southern part of the State do not have the body of northern grown fruit.
14	Central Square.....	.....	.....	.....	.....	.....	.....
15	Pennellville.....	.....	.....	.....	1	.....	.....
16	Volney.....	.....	1	.....	1	.....	.....

OSWEGO COUNTY.—(Concluded).

Order number.	POST-OFFICE.	Is there in this fruit containing 4.5 per cent of acetic acid?		If so, where?	4½.	4%.	Remarks.
		Yes.	No.				
1	Amboy Center	Manufacture cider only for my neighbors, so cannot inform you concerning acidity sell the most of my cider when it is sweet, sometimes sell a barrel of vinegar; know nothing of the strength of vinegar as I have no means of testing Have never made any vinegar for market. keep the standard as high as possible for everything we eat, drink or wear, or the medicine we use As I am a cidermaker only, I cannot answer the foregoing questions; but I think there is no trouble in reaching the higher percentage with pure cider I am opposed to a reduction of the standard, the best is none too good; in carry- ing this out, we find no trouble in it at fair prices, our test is by taste Have never had any way of testing Think the present law too exacting as to acetic acid; it is detrimental to the manufac- turer and leaves to the retailer a chance to reduce the vinegar, as the retailed article is seldom tested The standard should be no higher than 4%; at that there will be more uniform vinegar sold than there is at present Think the 4.5% detrimental to small manufacturers and the business; many cannot get 4 5%, while at 4% any honest maker can produce best goods.
2	Fulton	.....	.....	.....	.....	.....
3	Hannibal	.....	.....	.....	1	.....
4	Hastings	.....	.....	.....	.....	.....
5	Laurens	.....	.....	.....	1	.....
6	Mexico	.....	.....	.....	.....	.....
7	Minetto	.....	.....	.....	.....	1
8	New Haven	.....	.....	.....	.....	1
9	Oswego	1	.....	We understand that apples grown along the Hudson river and Long Island will not.	.....	1
10	Phoenix	.....	.....	.....	.....	1
11	North Hannibal	.....	.....	.....	1	.....
12	Phoenix	.....	.....	.....	.....	.....
13	Oswego Center	.....	.....	.....	.....	1
14	Central Square	.....	.....	.....	.....	.....
15	Pennellville	.....	.....	.....	.....	.....
16	Volney	.....	1	Not if the juices of the apple has not been re- duced.	1	.....

The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been made and is still being made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.

I think 4% strong enough for any one to put in their stomach; am unable to find market for juice from early fall fruit.
I think the standard low enough.
Vinegar should be made of pure juices, and nothing added to injure the good qualities of vinegar
I think cider vinegar 4% will suit the public, and it will be much better; it can be produced much easier, and the cider vinegar men will stand a better chance with the malt-vinegar men
I manufacture mostly cider, making last year 2,000 barrels.
I have difficulty in making 4.5% acetic acid
The standard should not be reduced; pure cider, given age, will make a powerful vinegar, strong enough to eat the shell of an egg.

OTSEGO COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manufacture during one season?	Where do you get your cider or cider-vinegar stock?
		Yea.	No.			
1	Burlington Flats	1	.....	10 years	700 gallons	Make it.
2	Fly Creek	1	.....	8 or 10 years	From 12 to 15 casks	Make it.
3	Laurens	1	.....	7 or 8 years	1 to 4 barrels	Make it.
4	Millford	1	.....	8 or 10 years	5 or 6 barrels	Make it.
5	Maryland	1	.....	.....	.....	Make it.
6	Salt Springville	1	.....	5 years	38,000 to 40,000 gallons cider.	Make it.
7	Worcester	1	.....	11 years	500 to 600 gallons	Make it.

OTSEGO COUNTY—(Continued).

Order number.	POST-OFFICE.	Where is the fruit grown from which the cider or stock you use is made?	Do you manufacture a uniform or a varying strength of vinegar as to acidity?		If of a varying strength, what is the lowest and greatest percentage of acidity that you manufacture?		Do you have any difficulty in producing in pure cider vinegar 4.55 of acidity?	
			Uniform.	Varying.	Lowest.	Greatest.	Yes.	No.
1	Burlington Falls	Vicinity .....	.....	1	.....	.....	.....	1
2	Fly Creek	Towns of Otsego, Hartwick, Exeter, Richfield Middlefield and Springfield.	.....	.....	.....	.....	.....	.....
3	Laurens	Town of Laurens .....	.....	1	.....	.....	.....	.....
4	Milford	Vicinity	1	.....	.....	.....	.....	.....
5	Maryland	Vicinity .....	.....	.....	.....	.....	.....	.....
6	Salt Springville	Vicinity .....	.....	.....	.....	.....	.....	.....
7	Worcester	Vicinity .....	.....	.....	.....	.....	.....	.....

OTSEGO COUNTY — (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the to do with they will		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	If so, what are those conditions?	Yes.	No.	If so, how?
1	Burlington Plains.....	.....	.....	.....	.....	.....	.....
2	Fly Creek.....	.....	.....	.....	1	.....	.....
3	Laurens.....	.....	.....	.....	.....	.....	.....
4	Milford.....	.....	.....	.....	1	.....	.....
5	Maryland.....	.....	.....	.....	.....	.....	.....
6	Salt Springville.....	.....	.....	.....	1	.....	.....
7	Worcester.....	.....	.....	.....	1	.....	.....

OTSEGO COUNTY — (Concluded).

Circular number.	POST-OFFICE.	Answers.			Remarks.
		Yes.	No.	If where?	
1	Burlington Falls	.....	1	Think not	Think it is well enough as it is, although it takes more time and care.
2	Fly Creek	.....	.....	.....	Think it very difficult to make a uniform vinegar; the standard does not make so much difference as the purity of the stock; the high per cent does not make so much difference
3	Laurens	.....	.....	.....	I do not understand how to get the per cent.
4	Millford	.....	.....	.....	It is impossible to get any five parts from apples that grow around here, in my opinion; most of my cider is sold sweet from the press.
5	Maryland	.....	.....	.....	As we have no means of testing we cannot tell whether our apples produce the required amount of acetic acid or not; should think there would be no trouble producing standard vinegar.
6	Salt Springville	.....	.....	.....	My opinion is that vinegar should contain its full 100% of pure cider; if it is too strong water will reduce it and give it a pleasant taste; manufacture mostly cider
7	Worcester	.....	1	.....	Judging from vinegar bought in Albany and sold in this town should think the standard low enough now.

QUEENS COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manufacture during one season?	Where do you get your cider or cider-vinegar stock?
		Yes.	No.			
1	Jericho.	1	.....	10 years	75 barrels.....	Make it from apples grown in Oyster Bay, Queens Co
2	Little Neck.....	1	.....	35 to 40 years.....	10 to 30 barrels	Make it.
3	Syosset.	1	.....	40 years	25 to 80 barrels	Make it.
4	Little Neck.....	1	.....	15 years	15 to 20 barrels	Make it.
5	Roalyn	1	.....	10 years	Mostly cider, few hundred barrels vinegar.	Queens county.
6	Glen Head.....	1	.....	14 years	200 barrels.....	Make it.

QUEENS COUNTY — (Continued).

Circular number.	POST-OFFICE.	Where is the fruit grown from which the cider or stock you use is made?	Do you manufacture a uniform or a varying strength of vinegar as to acidity?		If uniform what is the percentage of the acidity?	If of a varying strength, what is the lowest and greatest percentage of acidity that you manufacture?		Do you have any difficulty in producing in pure cider vinegar 4.5% of acidity?	
			Uniform.	Varying.		Lowest.	Greatest.	Yes.	No.
1	Jericho	Oyster Bay, Queens county .....	.....	.....	.....	.....	.....	.....	.....
2	Little Neck.....	Vicinity .....	.....	1	.....	4.5	7.5	.....	.....
3	Syosset	My own farm .....	.....	1	.....	.....	.....	.....	1
4	Little Neck.....	North Hempstead.....	.....	.....	.....	.....	.....	1	.....
5	Roslyn	Queens county .....	.....	1	.....	3.75	4.75	1	.....
6	Glen Head.....	Queens county	1	.....	.....	.....	.....	.....	.....

QUEENS COUNTY — (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes	No.	If so, what are those conditions?	Yes.	No.	If so, how?
1	Jericho	1	.....	Green fruit will not make vinegar at all; ripen the fruit the better.	1	....	Long Island russet apples make strongest and best vinegar of any apple grown; I use 5,000 bushels a year of them for cider only.
2	Little Neck .....	.....	1	Only in time of making, being three to four years.	1	....	.....
3	Syosset	1	.....	Unripe fruit, summer apples and unclean casks.	.....	....	.....
4	Little Neck	1	.....	Both; good sound apples, of the late varieties, make the best vinegar.	1	....	The same variety of apples, grown on different soils, produce vinegar of different strength.
5	Roslyn .....	.....	.....	.....	1	...	Apples grown in the middle and western part of the State will produce nearly one-half per cent more acetic acid.
6	Glen Head .....	.....	.....	.....	1	....	.....

QUEENS COUNTY — (Concluded).

Circular number	POST-OFFICE	Is there any acid in this State fruit will not containing 4.5 per cent of acetic acid?		If so, where?	4½%.	4%.	
		Yes.	No.				
1	Jericho .....	.....	1	I know of none .....	.....	1	Th
2	Little Neck .....	.....	.....	.....	1	.....	Th
3	Syosset .....	.....	.....	.....	1	.....	Th
4	Little Neck .....	.....	.....	.....	.....	.....	It
5	Roslyn	1	.....	Queens county, except under very favorable conditions.	1	.....	It
6	Glen Head .....	.....	.....	.....	.....	1	It takes us three years to make good vinegar; it is said that Long Island apples do not contain as much acetic acid as some parts of the State; the standard is so high we cannot compete with other parts of the State; hence it will be lowered

RENSSELAER COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar ?		How long have you been such ?	How much do you manufacture during one season ?	Where do you get your cider or cider-vinegar stock ?
		Yes.	No.			
1	Bath-on-the-Hudson.....	1	.....	5 years .....	.....	.....
2	Berlin	1	.....	10 years	25,000 gallons.....	.....
3	Cropseyville.....	1	.....	2 years	4,500 gallons.....	Make it.
4	Hoag's Corners.....	1	.....	Since 1878.....	50 to 100 barrels	Make it.
5	Johnsonville.....	1	.....	15 years	5,000 gallons.....	Make it.
6	Melrose.....	1	.....	4 years	10 to 15 barrels	Vicinity.
7	Melrose	1	.....	40 years	400 to 1,000 gallons.....	On my farm.
8	South Schodack.....	1	.....	3 years	40 to 50 barrels	Make it.
9	Troy.....	1	.....	7 years	6 to 12 barrels	Make it.
10	Troy.....	1	.....	25 or 30 years.....	5 to 50 barrels	Make it.
11	West Hoosick.....	1	.....	.....	25 barrels.....	Make it.
12	East Schodack	1	.....	12 years	500 to 1,000 barrels.....	Make it at East Schodack and Greenbush.
13	Lansingburgh	1	.....	20 years .....	.....	Make it.
14	Petersburgh.....	1	.....	6 years.....	500 gallons.....	Make it.

RENSSELAER COUNTY—(Continued).

Circular number.	POST-OFFICE.	Where is the fruit grown from which the cider or stock you use is made?	Do you manufacture a uniform or a varying strength of vinegar as to acidity?		If uniform what is the percentage of the acidity?	If of a varying strength, what is the lowest and greatest percentage of acidity that you manufacture?		Do you have any difficulty in producing in pure cider vinegar 4.5% of acidity?	
			Uniform.	Varying.		Lowest.	Greatest.	Yes.	No.
1	Bath-on-the-Hudson.....	New Haven, Oswego county, N. Y.	.....	1	.....	.....	3.5	1	.....
2	Berlin.....	Rensselaer county.....	.....	1	.....	.....	.....	.....	.....
3	Cropeauville.....	Town of Brunswick.....	.....	1	.....	.....	5.5	1	.....
4	Hoag's Corners.....	Vicinity.....	.....	1	.....	3.5	5.5	1	.....
5	Johnsonville.....	Northern part of Rensselaer county and southern part of Washington county.	1	.....	4.5	.....	.....	.....	1
6	Melrose.....	Melrose, Rensselaer county.....	.....	.....	.....	.....	.....	.....	.....
7	Melrose.....	Melrose, Rensselaer county.....	1	.....	.....	.....	.....	.....	.....
8	South Schodack.....	Vicinity.....	1	.....	4.5	.....	.....	.....	1
9	Troy.....	Vicinity.....	.....	1	.....	.....	.....	.....	.....
10	Troy.....	Own orchard.....	.....	.....	.....	.....	.....	.....	1
11	West Hoosick.....	Hoosick.....	.....	1	.....	.....	.....	.....	1
12	East Schodack.....	East Schodack and Greenbush.....	1	.....	4.5	.....	.....	1	.....
13	Lansingburgh.....	Rensselaer county.....	1	.....	.....	.....	.....	.....	1
14	Petersburgh.....	Petersburgh.....	1	.....	.....	.....	.....	.....	1

RENSSELAER COUNTY -- (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		If so, what are those conditions?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	Yes.	No.	Yes.	No.	Yes.	No.
1	East-on-the-Hudson	1	1	1	1	1	1	1	1
2	Herlis	1	1	1	1	1	1	1	1
3	Croseyville	1	1	1	1	1	1	1	1
4	Hoag's Corners	1	1	1	1	1	1	1	1
5	Johnsonville	1	1	1	1	1	1	1	1
6	Melrose	1	1	1	1	1	1	1	1
7	Melrose	1	1	1	1	1	1	1	1
8	South Schoharie	1	1	1	1	1	1	1	1
9	Troy	1	1	1	1	1	1	1	1
10	Troy	1	1	1	1	1	1	1	1
11	West Hoosick	1	1	1	1	1	1	1	1
12	East Schoharie	1	1	1	1	1	1	1	1
13	Lansingburgh	1	1	1	1	1	1	1	1
14	Petersburgh	1	1	1	1	1	1	1	1

RENSSELAER COUNTY — (Concluded).

Circular number.	POST-OFFICE.	acid?		If so, where?	4½%	4%	Remarks.
		Yes.	No.				
1	Bath-on-the-Hudson	.....	.....	.....	.....	1	Think 4% is sufficient for all practical purposes. In four years I make good vinegar; have
2	Berlin ..	.....	.....	.....	.....	1	
3	Cropeasyville.....	.....	.....	.....	1	.....	I think two standards too high. It should be placed at 4%. Change from 4½% to 4% is not advisable, as it would give the adulterator of cider vinegar a better chance to evade the law as it stands. I do not use any water or acids; my cider is strictly pure and customers call my vinegar first-class.
4	Hoag's Corners ..	.....	.....	.....	1	.....
5	Johnsonville ..	.....	.....	.....	.....	.....	The standard should be kept as it is so there can be no more impurities than at present; the large factories would like to lower the standard, that they might supply the trade and still make money. Think it would be well to reduce the standard to 4%, for some people could sell more vinegar than they do now.
6	Melrose .....	.....	.....	.....	.....	.....
7	Melrose .....	.....	.....	.....	1	.....	It is almost impossible to have vinegar of 4½% acetic acid without using a drug to make it so. I am in fact Think the from the Four per cent advanta rich and poor cider together.
8	South Schoharie ..	.....	.....	.....	.....	1	
9	Troy .....	.....	.....	.....	.....	1	I have never tasted my vinegar: I am well aware that vinegar can be too strong, eating whatever it is put upon; have no trouble in producing a very sharp vinegar. I think it would be unwise to lower the standard; vinegar made from pure cider will make 4½% vinegar in two years.
10	Troy .....	.....	.....	.....	1	.....
11	West Hoosick ..	.....	.....	.....	.....	1	I do not think any August or September apples will make via gar of 4½% acetic acid.
12	East Schoharie ..	1	.....	.....	.....	1	
13	Lansingburgh ..	.....	.....	.....	.....	.....	I think it would be unwise to lower the standard; vinegar made from pure cider will make 4½% vinegar in two years.
14	Petersburgh ..	.....	1	.....	1	.....

The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been and is still being made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.

ROCKLAND COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manu- facture during one season?	Where do you get your cider or cider-vinegar stock?
		Yes.	No.			
1	Garnerville	1	.....	25 years	6,000 to 10,000 gallons.	Raise the fruit from which it is made.
2	Bardonia	1	.....	20 years	As much as gets sour	Make it.
3	Palisades	1	.....	4 years	1,500 gallons.....	Make it.
4	Spring Valley	1	.....	35 years	800 to 1,000 barrels	Make it.

ROCKLAND COUNTY—(Continued).

Creeper number.	POST-OFFICE.	Where is the fruit grown from which the cider or stock you use is made?	Do you manufacture a uniform strength of vinegar as to acidity?		If uniform what is the percentage of the acidity?	If of a varying strength, acidity that you manufacture?		Do you have any difficulty in producing in pure cider vinegar 4.5% of acidity?	
			Uniform.	Varying.		Lowest.	Greatest.	Yes.	No.
1	Garnerville.....	Haverdraz	1	.....	.....	.....	.....	.....	.....
2	Bardonia	Rockland county.....	.....	.....	.....	.....	.....	.....	.....
3	Patterson	Northern part of New Jersey ..	.....	1	.....	.....	.....	.....	1
4	Spring Valley.....	Rockland county.....	.....	1	.....	3.5	4.5	1	.....

ROCKLAND COUNTY — (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	If so, what are those conditions?	Yes.	No.	If so, how?
1	Garnerville .....	....	....	.....	....	....	.....
2	Bardonia .....	....	....	.....	....	....	.....
3	Palisades	1	...	Due to the season, the fruit and the weather.	1	....	.....
4	Spring Valley	1	....	Late or winter apples, only, will make vinegar of 4.5% acetic acid.	1	....	Apples grown north contain a trifle less sugar than those grown south.

ROCKLAND COUNTY — (Concluded).

Circular number.	POST-OFFICE.	Is there any acid in this State fruit will not containing 4.5 per cent of acetic acid?		If so, where?		4½.	4.	Remarks.
		Yes.	No.					
1	Garnerville.....	1	<p>The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been and is still being made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.</p> <p>As 4½ is near the highest mark, I should say that 4½ is better and what many vinegar makers produce, and if it is put at 4½ it will make but slight difference; I have only a taste test.</p> <p>I manufacture cider and apple that which becomes too sour for either I make vinegar of, not relying stated quantity, have made it so sour that 80% water had to be added to is</p> <p>I believe in having pure cider of so much acid vinegar.</p> <p>The law should be changed to 4½ for three reasons. First, there would be no cause to evade the law; second, early apples, which are now wasted, could be used; and, third, the whole product could be made into vinegar.</p>
2	Bardonia.....	.....	.....	.....	.....	.....	.....
3	Palisades.....	1	.....	Southern New York and northern New Jersey.	.....	.....	.....
4	Spring Valley.....	1	.....	The whole crop in this State including early and late, will not produce vinegar of 4.5% acid	.....	.....	1

ST. LAWRENCE COUNTY.

Circular number.	POST-OFFICE	Are you a manufacturer of cider vinegar ?		How long have you been such ?	How much do you manu- facture during one season ?	Where do you get your cider or cider-vinegar stock ?
		Yes.	No.			
1	Chase's Mills'	1	.....	.....	30 barrels.....	Make it.....
2	Lawrenceville .....	.....	1	.....	.....	Make it.....
3	Potsdam.....	1	.....	18 or 20 years.....	10 to 15 barrels	Make it.....
4	Lisbon Centre	1	.....	.....	.....	.....

ST. LAWRENCE COUNTY — (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	If so, what are those conditions?	Yes.	No.	If so, how?
1	Chase's Mills.....	....	....	.....	....	....	.....
2	Lawrenceville .....	....	....	.....	....	....	.....
3	Potadam. ....	....	....	.....	1	....	.....
4	Lisbon Centre .....	....	....	.....	....	....	.....

ST. LAWRENCE COUNTY -- (Concluded).

Circular number	POST-OFFICE.	Is there in this fruit containing 4.5 per cent of acetic acid?		If so, where?	4/5s.	4s.	Remarks.
		Yes.	No.				
1	Chase's Mills .....	....	....	.....	....	....	I have a small cider mill; make cider for myself and neighbors; do not understand any thing about per cent acidity; when sharp enough for our taste we use it.
2	Lawrenceville .....	....	....	.....	1	....	The percentage is sufficiently low; I do not believe there is any pure cider vinegar that will not produce 4.5% acidity; am not manufacturing at present.
3	Potdam .....	....	1	Not if made from pure cider.	....	....	Vinegar that I have sold has been tested by inspector and found pure cider vinegar.
4	Lisbon Centre .....	....	....	.....	....	....	I employ a chemist to analyze my vinegar; there is no does not pay to make cider vinegar; I make it pure,

The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.

SARATOGA COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manufacture during one season?	Where do you get your cider or cider-vinegar stock?
		Yes.	No.			
1	East Line.....	1	.....	30 years	2,000 gallons.....	Make it.
2	Waterford.....	1	.....	30 years	4,000 casks	Make a portion and buy some.
3	West Galway.....	.....	1	.....	.....	Make it.
4	West Milton.....	1	.....	.....	Enough for my own use...	.....
5	Ketchum's Corners	1	.....	16 years	3,000 to 4,000 gallons	Make it.
6	Malta.....	1	.....	20 years	50 casks	Make it.
7	Mechanicville	1	.....	30 years .....	.....	Make it.
8	Mechanicville .....	.....	1	.....	8 to 10 barrels	Make it.
9	Milton Center	1	.....	.....	.....	Make it.
10	Porter's Corners.....	1	.....	6 years	1 to 3 barrels	Make it.

SARATOGA COUNTY — (Concluded).

Circular number.	POST-OFFICE.	The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.			Remarks.	
		Yes.	No.	If so, where?	4½%.	4%.
1	East Line.....	....	....	.....	....	1
2	Waterford.....	....	....	.....	1	....
3	West Galway.....	....	....	.....	....	....
4	West Milton.....	....	....	.....	....	....
5	Ketchum's Corners.	....	....	.....	....	1
6	Malta.....	....	....	.....	....	1
7	Mechanicville.....	....	....	.....	1	....
8	Mechanicville.....	....	....	.....	1	....
9	Milton Center.....	....	....	.....	....	....
10	Porter's Corners.....	....	....	.....	....	....

The standard should be reduced to 4%; my trade is small and my customers do not

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SCHENECTADY COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manu- facture during one season?	Where do you get your cider or cider-vinegar stock?
		Yes.	No.			
1	Alplaus.....	1	.....	.....	.....	Make it.
2	Schenectady	1	.....	1 year	45,000 gallons.....	Make it.
3	Pattersonville	1	.....	25 years	300 to 500 gallons	Make it.

SCHENECTADY COUNTY — (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?			Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?			Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?		
		Yes.	No.	If so, what are those conditions?	Yes.	No.	If so, what?	Yes.	No.	If so, how?
1	Alplaus .....	....	....	.....	....	....	.....	....	....	.....
2	Schenectady .....	....	....	.....	....	....	.....	....	....	.....
3	Pattersonville .....	....	1	We have no difficulty in producing vinegar of 4.5% acidity.	....	....	.....	....	....	.....

SCHENECTADY COUNTY — (Concluded).

Circular number	POST-OFFICE.	Is there any in this State fruit will not containing 4.5 per cent of acetic acid?		If so, where?		4½.	4.	Remarks.
		Yes.	No.					
1	Albans.....	.....	.....	.....	.....	.....	1	The standard should be reduced so that the retailer need not reduce with water, as is often the case; I make vinegar in the old way by are and believe it is the only way
2	Schenectady .....	.....	.....	.....	.....	1	....	general use in
3	Pattersonville .....	.....	.....	.....	.....	1	....	; to reduce the

SCHOHARIE COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar ?		How long have you been such ?	How much do you manufacture during one season ?	Where do you get your c'der or cider-vinegar stock ?
		Yes.	No.			
1	Barnesville	1	.....	10 years	4 or 5 barrels.....	Make it.
2	Cobleskill	1	.....	5 years	25 to 50 casks	Make it.
3	Schoharie	1	.....	12 years	100 to 1,000 or more barrels.	Make it.
4	Howe's Cave	1	.....	18 years	10 to 15 barrels	Make it.
5	Manor Kill.....	1	.....	25 years	1 barrel	Make it.
6	Richmondville.....	1	.....	10 years	25 to 300 barrels	Make it.
7	Seward	1	.....	20 years .....	.....	Make it.
8	Sharon Centre.....	1	.....	10 years	5 to 8 barrels	Make it.
9	Sharon Springs.....	1	.....	Number of years.....	10 to 12 casks.....	Make it.

SCHOHARIE COUNTY -- (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		If so, what are those conditions?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	Yes.	No.	Yes.	No.	Yes.	No.
1	Barneviller					1			
2	Cobleskill	1		Older made in September is not as good.		1			
3	Schoharie	1		Condition of fruit, and, also, different seasons produce different results.		1			
4	Howe's Cave	1		Some years vinegar is made quicker than others.		1			
5	Manor Kill					1			
6	Richmondville	1		Not good fruit		1			
7	Seward								
8	Sharon Centre								
9	Sharon Springs								

SCHOHARIE COUNTY — (Concluded).

Circular number.		Returns.									
1	Barnesville.....	.....	.....	.....	.....	.....	.....	.....	.....	I have lost no test but; having no experience I am unable to judge.	.....
2	Cobleskill.....	.....	.....	.....	.....	.....	.....	.....	.....	If the be lo I am in N. Y over and	.....
3	Schoharie.....	.....	1	.....	.....	.....	.....	.....	.....	letter for all concerned, as there would contending at the last meeting of the standard After looking the ground of farmers and small manufacturers, wisdom of such action.	.....
4	Howe's Cave.....	.....	.....	.....	.....	.....	.....	.....	.....	ider vinegar, and think that would come up but I think that vinegar from early fruit or r with good, pure stock cider that is easily gs are slow; we have apples enough to make I am not posted on per cent of acetic acid; I	.....
5	Manor Kill.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
6	Richmondville.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
7	Seward.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
8	Sharon Centre.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
9	Sharon Springs.....	.....	.....	.....	.....	.....	.....	.....	.....	I think it ought to remain 4.75 of acetic acid.	.....

SCHUYLER COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar ?		How long have you been such ?	How much do you manufacture during one season ?	Where do you get your cider or cider-vinegar stock ?
		Yes.	No.			
1	Beaver Dams	1	.....	2 years	2,000 gallons.....	Make it.
2	Moreland	1	.....	40 years	Home trade only.....	Make it.
3	Reading Centre	1	.....	20 years	15 barrels.....	Make it.
4	Cayuta	1	.....	25 years	2,000 to 3,000 barrels of cider.	Make it.
5	Townsend	1	.....	.....	.....	Make it.

SCHUYLER COUNTY -- (Concluded).

Circuit number.	POST-OFFICE.	Is there any adulteration existing			4½.	4.	Remarks.
		Yes.	No.	If so, where?			
1	Beaver Dams.....	....	....	.....	....	....	The fact that I have only started in, and it is an experiment as yet with me, having never tested or sold any vinegar, I have no opinion in regard to the percentage of acidity.
2	Moreland.....	....	1	Not if the manufacturer makes no more than two barrels of vinegar out of every barrel of cider.	1	....	It would be better to raise it to 6½ or more; there would be less water sold for vinegar; good vinegar is driven out of the market; watered cider makes vinegar quicker than pure cider; the more water the less acid.
3	Reading Centre....	....	....	.....	....	....	We do not test our vinegar.
4	Onayuta.....	....	....	.....	....	....	I run a custom mill; we can not manufacture vinegar and compete with that not made from pure cider, as the merchant can sell it for less than half for which we can make it.
5	Townsend.....	....	....	.....	....	....	I have never made much vinegar to sell, and I do not know any thing about the percentage of acidity.

SENECA COUNTY.

Circular number.	1	Seneca Falls.....	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manufacture during one season?	Where do you get your cider or cider-vinegar stock?
			Yes.	No.			
			.....	1	.....	Made it	Seneca county.

SENECA COUNTY — (Continued).

Circular number.	POST-OFFICE.	Where is the fruit grown from which the cider or stock you use is made?	Do you manufacture a uniform or a varying strength of vinegar as to acidity?		If uniform what is the percentage of the acidity?	If of a varying strength, acidity that you manufacture?		Do you have any difficulty in producing in pure cider vinegar 4.5% of acidity?	
			Uniform.	Varying.		Lowest.	Greatest.	Yes.	No.
1	Seneca Falls.....	.....	.....	1	.....	.....	.....	1	.....

SENECA COUNTY — (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	If so, what are those conditions?	Yes.	No.	If so, how?
1	Seneca Falls.....	1	....	The riper the fruit the better.	....	1	Not if ripe.....

SENECA COUNTY — (Concluded).

Circular number.	POST-OFFICE	Is there any acid in the State fruit will not containing 4.5 per cent of acetic acid?		If so, where?	The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.		Remarks.
		Yes.	No.		4½%.	4%.	
1	Seneca Falls.....	.....	.....	.....	.....	.....	If the standard scale can be produced from all kinds of fruit it should be kept up; old trees will not produce as strong vinegar as young trees; sweet apples make the strongest cider.

STEUBEN COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar ?		How long have you been such ?	How much do you manufacture during one season ?	Where do you get your cider or cider-vinegar stock ?
		Yes.	No.			
1	Avoca .....	.....	1	From 1870 to 1890.....	Varied quantities.....	Make it.
2	Kanona	1	.....	30 years	40 gallons.....	Apples from my orchard.
3	Nell's Creek .....	.....	1	10 years .....	.....	.....
4	Prattsburgh.....	1	.....	14 years	10 barrels.....	Use surplus stock from cider mill.
5	Prattsburgh.....	.....	1	4 or 5 years.....	.....	From apples.
6	Wallace	1	.....	.....	5 to 20 barrels	Make it.
7	Bennett's Creek.....	1	.....	.....	.....	.....
8	Cooper's Plains	1	.....	4 years	50 to 200 barrels	Make it.
9	Prattsburgh.....	1	.....	3 years	500 gallons.....	Make it.
10	Prattsburgh.....	1	.....	5 years	800 gallons.....	Make it.
11	Thurston	1	.....	12 years	200 to 200 gallons	Make it.

STUBEN COUNTY — (Continued).

Circular number.	POST-OFFICE.	Where is the fruit grown from which the cider or stock you use is made?	Do you manufacture a uniform strength of vinegar as to acidity?		If uniform what is the percentage of the acidity?	If of a varying strength, lowest, greatest, and average?		Do you have any difficulty in producing in pure cider vinegar 4 lbs of acidity?	
			Uniform.	Varying.		Lowest.	Greatest.	Yes.	No.
1	Avoca	Vicinity .....	.....	.....	.....	.....	.....	.....	.....
2	Kanona .....	.....	1	.....	.....	.....	.....	.....	.....
3	Nell's Creek .....	.....	.....	1	.....	5	6	.....	1
4	Prattsburgh	On the east shore of Lake Keweenaw.	1	.....	.....	.....	.....	.....	1
5	Prattsburgh	Town of Prattsburgh .....	.....	1	.....	4	6	.....	1
6	Wallace	Vicinity .....	.....	1	.....	.....	.....	.....	.....
7	Bennett's Creek .....	.....	.....	.....	.....	.....	.....	.....	.....
8	Cooper's Plains	Vicinity .....	.....	1	.....	3.5	4.5	1	.....
9	Prattsburgh	Town of Prattsburgh .....	.....	1	.....	4.5	6	1	.....
10	Prattsburgh	Town of Prattsburgh .....	.....	1	.....	6	10	..	1
11	Thurston	Town of Thurston	1	.....	.....	.....	.....	.....	.....

STEBEN COUNTY — (Continued).

Circular number	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?		If so, how?
		Yes.	No.	Yes.	No.	Yes.	No.	
1	Avoca	1	....	1	....	1	....	The better the quality of the apples and the better the
2	Kanona	1	....	1	....	1	....	.....
3	Nell's Creek	1	....	1	....	1	....	.....
4	Prattsburgh	1	....	1	....	1	....	Apples grown nearest the lake contain more sugar than those grown in more exposed localities, consequently make stronger vinegar.
5	Prattsburgh	1	....	1	....	1	....	.....
6	Wallace	1	....	1	....	1	....	.....
7	Bennett's Creek	1	....	1	....	1	....	.....
8	Cooper's Plains	1	....	1	....	1	....	.....
9	Prattsburgh	1	....	1	....	1	....	.....
10	Prattsburgh	1	....	1	....	1	....	Early fruit will not make as good vinegar as the later varieties.
11	Thurston	1	....	1	....	1	....	.....

STEBEN COUNTY—(Concluded):

Circular number.	POST-OFFICE.	Answers.			If so, where?	4½%	4%.	Remarks.
		Yes.	No.					
1	Avoca .....	.....	.....	.....	.....	1	.....	The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been and is still being made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.
2	Kanona .....	.....	.....	.....	.....	.....	.....	I have no trouble in making good vinegar; I have no means of testing.
3	Nell's Creek .....	.....	.....	.....	.....	1	.....	The standard is low enough; the vinegar is better at that, or even 5% acetic acid.
4	Prattsburgh .....	.....	.....	.....	.....	1	.....	Not using a standard test, I am not prepared to state my views, but from what I have heard and read I think there is no difficulty in making from pure cider, of good quality, vinegar of standard test.
5	Prattsburgh .....	.....	.....	.....	.....	.....	.....	I have not tested enough to be able to answer the last question intelligently.
6	Wallace .....	.....	.....	.....	.....	1	.....	I make cider for drinking purposes and use the refuse and settlings for vinegar; think 4.5% is low enough.
7	Bennett's Creek .....	.....	.....	.....	.....	1	.....	I think they had better try to make a better grade instead of a poorer one; there is no trouble making standard vinegar with pure cider.
8	Cooper's Plains .....	.....	.....	.....	.....	.....	1	I think the rate is too high; 4% would be full enough, and still leave the goods strong enough for any purpose.
9	Prattsburgh .....	.....	.....	.....	.....	1	.....	or they can add water, but you cannot improve weak added; reduction would encourage and enable manufacture with pure cider-vinegar.
10	Prattsburgh .....	.....	.....	.....	.....	1	.....	The standard is plenty low enough; if people wish less acid they can easily dilute it.
11	Thurston .....	.....	.....	.....	.....	.....	.....	Being aware that the standard is very high, I do not make vinegar for market; sell mostly sweet cider; the vinegar I make I sell here at home.

SUFFOLK COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manufacture during one season?	Where do you get your cider or cider-vinegar stock?
		Yes.	No.			
1	Huntington	1	.....	8 or 9 years.....	100 barrels.....	Make it.
2	Lake Grove.....	1	.....	20 years.....	50 barrels.....	Make it.
3	Riverhead	1	.....	8 years.....	1,000 to 2,000 barrels.....	Make it.
4	East Setauket	1	.....	6 years.....	40 to 50 barrels.....	West Setauket, East Setauket, Old Field and Port Jefferson.
5	Huntington.....	1	.....	20 years.....	200 to 2,000 gallons.....	Make it.

SUFFOLK COUNTY — (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	If so, what are those conditions?	Yes.	No.	If so, how?
1	Huntington....	1	....	Early apples are not good....	1	....	.....
2	Lake Grove.....	1	....	Well-ripened fruit produces high percentage of acidity here.	1	....	.....
3	Riverhead .....	....	....	.....	....	....	.....
4	East Setauket	1	....	Different fruit contains different per cent of acid.	1	....	The climate of the northern part of the State is best adapted to raising apples.
5	Huntington.....	....	....	.....	....	....	Have had no experience except with Long Island apples.

SUFFOLK COUNTY — (Concluded).

Circuler number.	POST-OFFICE.	acid?			4½%	4%	Remarks.
		Yes.	No.	If so, where?			
1	Huntington .....	.....	.....	.....	.....	1	The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been and is still being made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.
2	Lake Grove .....	.....	.....	.....	.....	1	If the standard is lowered to 4% it will be some inducement to us to make vinegar, but not largely, as apples are always high priced in this part of the country.
3	Riverhead .....	.....	.....	.....	.....	1	I am satisfied that 4% acetic acid would be a good and sufficient standard.
4	East Settleket .....	.....	1	Certain kinds of fruit will make poor cider and vinegar.	.....	1	Having had little experience I may say that summer and early fall apples, if sugar; the fermentation produces a most vinegar is made from watery and containing little of acid.
5	Huntington .....	.....	.....	.....	.....	1	The standard at 4% is high enough, as it is very difficult to get all cider up to 4% acetic acid.
		.....	.....	.....	.....	.....	Acetic acid being so cheap anyone can produce vinegar of any required acidity; legislation on the subject I consider to amount to less than nothing in point of usefulness.

SULLIVAN COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manufacture during one season?	Where do you get your cider or cider-vinegar stock?
		Yea.	No.			
1	Burlingham .....	.....	1	.....	.....	.....
2	Bushville.....	1	.....	13 years	100 to 200 barrels	Make it
3	Callicoon Depot.....	1	.....	10 years	5 barrels.....	Make it.
4	Hankins.....	1	.....	.....	.....	Make it.
5	Youngsville	1	.....	10 years .....	.....	Make it.
6	Monticello.....	1	.....	10 years	2 casks	Make it.

SULLIVAN COUNTY — (Continued).

Circular number.	POST-OFFICE.	Where is the fruit grown from which the cider or stock you use is made?	Do you manufacture a uniform or a varying strength of vinegar as to acidity?		If uniform what is the percentage of the acidity?	If of a varying strength, what is the lowest and greatest percentage of acidity that you manufacture?		Do you have any difficulty in producing in pure cider vinegar 4 5% of acidity?	
			Uniform.	Varying.		Lowest.	Greatest.	Yes.	No.
1	Burlingham .....	.....	.....	.....	.....	.....	.....	.....	.....
2	Bushville	Vicinity	1	.....	4.5	.....	.....	.....	1
3	Callicoon Depot.....	Own orchard.....	.....	1	.....	.....	.....	.....	.....
4	Hankins	Vicinity .....	.....	.....	.....	.....	.....	.....	.....
5	Youngsville	Vicinity .....	.....	.....	.....	.....	.....	.....	1
6	Monticello.....	Own orchard .....	.....	1	.....	.....	.....	1	.....

TIoga COUNTY -- (Continued).

Circular number.	POST-OFFICE.	Where is the fruit grown from which the cider or stock you use is made?	Do you manufacture a uniform or a varying strength of vinegar as to acidity?		If uniform what is the percentage of the acidity?	If of a varying strength, what is the lowest and greatest percentage of acidity that you manufacture?		Do you have any difficulty in producing in pure cider vinegar of the acidity?	
			Uniform.	Varying.		Lowest.	Greatest.	Yes.	No.
1	Apalachin	Southern New York and northern Pennsylvania.	1	.....	*18	.....	.....	.....	.....
2	Halsey Valley .....	.....	.....	.....	.....	.....	.....	.....	.....
3	Owego.....	Tioga county, N. Y., and Bradford county, Penn.	1	.....	.....	.....	.....	1	.....
4	Spencer	Tioga and Tompkins counties..	.....	.....	.....	.....	.....	.....	1
5	Waverly.....	Vicinity.....	.....	.....	.....	.....	.....	.....	.....

* This is undoubtedly an error.

TOMPKINS COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manufacture during one season?	Where do you get your cider or cider-vinegar stock?
		Yes.	No.			
1	Caroline Depot	1	.....	Always	1 barrel	Make it.
2	Etna	1	.....	3 years	3 to 10 barrels	Make it.
3	Ithaca	1	.....	8 years .....	.....	Tompkins county.
4	Ithaca	1	.....	20 years	20 to 25 barrels	Vicinity.
5	McLean	1	.....	8 years	5 to 10 barrels	Make it.
6	West Groton	1	.....	8 years	100 to 600 barrels of cider ..	Make it.
7	Trumbull Corners .....	.....	1	.....	.....	.....

TOMPKINS COUNTY — (Concluded).

Circular number	POST-OFFICE	I			4 1/2. 4s.		Remarks.
		Yes.	No.	If so, where?			
1	Carolina Depot.....	....	....	.....	....	1	The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.
2	Etna.....	....	....	.....	1	....	Think pure cider vinegar of 4% acetic acid better than a medicated article with a greater per cent of acetic acid; I am in favor of the reduction.
3	Ithaca.....	....	....	.....	....	1	T one too high; I have recently tested merchants' vinegar ; also tested farmers' vinegar and found it from 2.7% to
4	Ithaca.....	....	....	.....	1	....	Think that 40-grain vinegar is strong enough for use.
5	McLean.....	....	....	.....	....	....	I would rather it should remain as it is now.
6	West Groton.....	....	....	.....	....	....	I think the standard would be too high for early-made cider, but very late would probably stand the test.
7	Trumbull Corners ..	....	....	.....	1	....	We do not manufacture into vinegar all the cider, as we run a custom mill. I am not now manufacturing; am aware that there is a great deal of adulterated vinegar on the market; the laws should be more stringent against it.

ULSTER COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manufacture during one season?	Where do you get your cider or cider-vinegar stock?
		Yes.	No.			
1	Accord	1	.....	20 years,	10 to 20 barrels	Make it.
2	Esopus-on-Hudson	1	.....	7 years	1,000 to 50,000 gallons	Make it.
3	Gardiner	1	.....	15 years . . . . .	.....	Make it.
4	Highland	1	.....	5 years	200 casks	Towns of Lloyd, Marlborough and Plattekill, Ulster county.
5	Highland . . . . .	.....	1	.....	.....	.....
6	Marlborough . . . . .	.....	1	10 years	From 3,000 to 5,000 gallons	Made it.
7	Milton	1	.....	20 years	4,000 gallons	Make it.
8	Napanoch . . . . .	.....	1	.....	.....	.....
9	Saint Remy . . . . .	.....	1	.....	.....	.....
10	Stone Bridge	1	.....	.....	.....	.....
11	Wallkill	1	.....	8 years . . . . .	.....	.....
12	Highland	1	.....	5 years	200 barrels	Make it.
13	Kingston	1	.....	5 years	700 barrels	Make it.
14	Shandaken . . . . .	.....	1	.....	.....	.....
15	West Saugerties	1	.....	20 years	500 to 1,000 gallons	Make it.

ULSTER COUNTY — (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		If so, what are those conditions?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?		If so, how?
		Yes.	No.			Yes.	No.	Yes.	No.	
1	Accord	1	.....	It takes too the most stances. Early fruit ings will vinegar; early handson, was produced good vinegar. Early fruit will not make as strong vinegar as late or ripe fruit.		.....	.....	.....	.....	.....
2	Esopus-or-Hudson .....	.....	.....			1	.....	.....	.....	.....
3	Gardiner	1	.....			.....	.....	.....	.....	There is a great difference in fruit; common, natural apples are the richest in saccharine matter; they will make more and better vinegar than grafted fruit. The climate and soil
4	Highland	1	.....	Time of year and kind of fruit.		1	.....	1	.....	.....
5	Highland .....	.....	.....			.....	.....	.....	.....	.....
6	Marlborough	1	.....	Early apples and Rhode Island greenings make cider of a very weak and poor grade.		1	.....	.....	.....	Our experience is confined to our own locality.
7	Milton .....	.....	.....			1	.....	.....	.....	.....
8	Napanoch .....	.....	.....			.....	.....	.....	.....	.....
9	Saint Remy .....	.....	.....			.....	.....	.....	.....	.....
10	Stone Bridge .....	.....	.....			.....	.....	.....	.....	.....
11	Wallkill .....	.....	.....			.....	.....	.....	.....	.....
12	Highland	1	.....	Early unripe fruit will not make as good vinegar as ripe fruit.		.....	.....	.....	.....	.....

ULSTER COUNTY — (Concluded).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	If so, what are those conditions?	Yes.	No.	If so, how?
13	Kingston .....	....	....	.....	1	....	Apples in the western part of the State produce much higher percentage of acetic acid than those in the eastern part.
14	Shandaken .....	....	....	.....	1	....	.....
15	West Saugerties.....	....	1	I have no difficulty with vine-gar at three years old.	....	....	.....

ULSTER COUNTY — (Concluded).

Circular number.	POST-OFFICE	Is there any apple-growing section in this State where the ripened fruit will not produce a vinegar containing 4.5 per cent of acetic acid?		If so, where?	4½%. 4%.	Remarks.
		Yes.	No.			
1	Accord .....	.....	.....	.....	1	Think it should be reduced to 4%, as 4.5% is too strong for most uses; a farmer having a barrel or two of vinegar for sale each year cannot afford to have a tester,
2	Esopus-on-Hudson .....	.....	.....	.....	1	excess of 4.5% acetic or slightly in excess;
3	Gardiner	1	.....	I do not think greenings will make it, grow them where you may.	1	the trade say; I make
4	Highland	1	.....	Greenings will not	1	
5	Highland .....	.....	.....	.....	1	You cannot make 4.5% vinegar unless the cider stands 30° and over by hydrometer, and there is no cider before the first of October that will stand it; it would benefit the fruit grower and the consumer to reduce the standard
6	Marlborough .....	.....	.....	.....	.....	I do not think vinegar can be made to produce 4.5% acetic acid from apples as grown in this section
7	Milton .....	.....	.....	.....	1	We abandoned the business four years ago on account of the cheap vinegar put upon the New York market, and put sheep and pigs in the orchard, converting our fruit into wool, mutton and pork
8	Napanoch .....	.....	.....	.....	1	Impossible for small makers to make it up to 4.5% acetic
9	Saint Remy .....	.....	.....	.....	1	vinegar, but was compelled to of this patent vinegar, as I
10	Stone Bridge .....	.....	.....	.....	1	the standard should be
11	Wallkill .....	.....	.....	.....	1	
12	Highland .....	.....	.....	.....	1	who makes a small quantity means to get it up to 4.5% acetic
13	Kingston .....	.....	.....	There is no section that will not produce 4.5% acetic acid from late, ripe fruit.	1	; at 4% we can run our mills now wasted, there being no market for them.
14	Shandaken .....	.....	.....	.....	1	I think the standard ought to be 4%; I do not make vinegar for the reason that it is high; pure cider vinegar is not

WARREN COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar ?		How long have you been such ?	How much do you manufacture during one season ?	Where do you get your cider or cider-vinegar stock ?
		Yes.	No.			
1	Glens Falls .....	.....	1	2 years	400 barrels of cider in 1888..	Made it.
2	Glens Falls	1	.....	9 years	50 to 150 barrels	Make it.
3	Johnsburgh .....	.....	1	.....	.....	.....
4	Queensbury	1	.....	25 years	25 to 50 barrels	Make it.
5	Queensbury .....	.....	1	.....	.....	.....
6	Thurman.....	1	.....	27 years	8 barrels.....	Make it.
7	Weavertown	1	.....	3 years	25 barrels.....	Make it.
8	Athol.....	1	.....	4 years	1 barrel.....	Make it.

WARREN COUNTY — (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	If so, what are those conditions?	Yes.	No.	If so, how?
1	Glens Falls .....	....	....	.....	....	1	It depends more on species of fruit than climate and soil.
2	Glens Falls .....	....	....	.....	1	....	.....
3	Johnsbury.....	....	....	.....	....	....	.....
4	Queensbury	1	....	Fruit from clay soil is more watery than that from sandy or gravelly soil; it should be well-developed and mellow.	1	....	.....
5	Queensbury .....	....	....	.....	....	....	.....
6	Thurman	1	....	Early-gathered, partly green or partly bad fruit, will not stand the test.	....	....	.....
7	Weavertown.....	....	....	.....	....	....	.....
8	Althol .....	....	1	I find that the best cider is made from sweet and sour apples mixed, gathered late and fully ripe.	1	1	Crab apples make a richer and better quality of cider than common apples; the difference is in manner of making.
.							

WARREN COUNTY — (Concluded).

Circular number	POST-OFFICE	Is there any acid in this State fruit will not containing 4.5 per cent of acetic acid?		If so, where?	4½%	4%	Remarks.
		Yes.	No.				
1	Glens Falls.....	1	I think it would be fair to reduce the standard to 4% unless for certain purposes 4.5% is required, in which cases it should be the latter. I am in favor of reducing the standard; I run a custom mill and sell a great deal of to 100 barrels a year for vinegar. as poor enough for any one. ; there is now on the market vinegar that is worthless vinegar. cheap acid vinegar has killed the trade in this country. ples and was doing well until this vinegar law was passed; it spoiled my business, as nothing but sound, ripe fruit ar. stage; if your figures of 4.5% acidity is nothing extra in law should stand as it is; the law should protect the consumer.
2	Glens Falls.....	.....	.....	.....	.....	1
3	Johnsbury.....	.....	.....	.....	1	.....
4	Queensbury.....	.....	.....	.....	1	.....
5	Queensbury.....	
6	Thurman.....	.....	.....	.....	.....	1
7	Weavertown.....	.....	.....	.....	.....	.....
8	Atcho.....	

WASHINGTON COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar ?		How long have you been such ?	How much do you manufacture during one season ?	Where do you get your cider or cider-vinegar stock ?
		Yes.	No.			
1	Hampton.....	1	.....	16 years	25 to 100 barrels	Make it.
2	North Greenwich.....	1	.....	2 years	20 barrels, mostly cider	Raise the fruit.
3	South Argyle	1	.....	12 years	400 to 500 gallons	Make it.
4	Argyle	1	.....	18 years	2,000 barrels cider	Make it.
5	Colla	1	.....	13 years .....	.....	Make it.
6	Fly Summit.....	1	.....	15 years	1,000 to 2,000 barrels cider..	Make it.
7	North Easton.....	1	.....	5 years	20 to 50 barrels	Make it.
8	North Granville	1	.....	25 years	25 casks	Make it.
9	Sandy Hill	1	.....	.....	.....	.....
10	South Hartford	1	.....	15 years .....	.....	Make it.
11	Whitehall	1	.....	10 years	10 to 15 casks.....	Make it.
12	Salem	1	.....	7 or 8 years.....	10 barrels.....	Make it.

WASHINGTON COUNTY — (Continued).

Circular number.	POST-OFFICE.	Where is the fruit grown from which the cider or stock you use is made?	Do you manufacture or a varying strength of vinegar as to acidity?		If uniform what is the percentage of the acidity?	If of a varying strength, what is the lowest and greatest percentage of acidity that you manufacture?		Do you have any difficulty in producing in pure cider vinegar 4.5% of acidity?	
			Uniform.	Varying.		Lowest.	Greatest.	Yes.	No.
1	Hampton	Washington county, N. Y., and Rutland, Vt.	.....	.....	.....	.....	.....	.....	.....
2	North Greenwich.....	Town of Greenwich	1	.....	4.5	.....	.....	.....	1
3	South Argyle.....	Argyle and adjoining towns....	.....	1	.....	.....	.....	.....	.....
4	Argyle	Washington county .....	.....	1	.....	.....	.....	.....	.....
5	Colla	Town of Jackson.....	.....	1	.....	.....	.....	.....	.....
6	Fly Summit.....	Washington county .....	.....	.....	.....	.....	.....	.....	.....
7	North Easton	Town of Easton .....	.....	1	.....	.....	.....	.....	.....
8	North Granville	Vicinity, and some in Vermont.	.....	.....	.....	.....	.....	.....	1
9	Sandy Hill.....	.....	.....	.....	.....	.....	.....	.....	1
10	South Hartford	Washington county .....	.....	1	.....	.....	.....	1	.....
11	Whitehall	Vicinity .....	.....	1	.....	.....	.....	.....	.....
12	Salem	Vicinity	1	.....	.....	.....	.....	.....	.....

WASHINGTON COUNTY—(Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the am. unt of acetic acid they will produce?	
		Yes.	No.	If so, what are those conditions?	Yes.	No.	If so, how?
1	Hampton	1	1	Windfalls or unripe fruit are not good.	1	1	Not if sound and ripe.
2	North Greenwich						
3	South Argyle				1		
4	Argyle						
5	Coffa				1		
6	Fly Summit						
7	North Easton						
8	North Granville		1				
9	Sandy Hill		1	Pure cider, with a good stock body, will make the best of vinegar.			
10	South Hartford	1			1		
11	Whitehall				1		The more juice the more acid.
12	Salem						

WASHINGTON COUNTY — (Concluded).

Circular number.	POST-OFFICE.	Is there in this fruit containing 4.5 per cent of acetic acid?		If so, where?	4½%.	4%.	Remarks.
		Yes.	No.				
1	Hampton.....	.....	.....	.....	.....	1	Think the change is preferable; it is no trouble to make first-class vinegar, but when we are compelled to compete with beer slops and rain water there is no money in the business.
2	North Greenwich.....	.....	.....	.....	.....	.....	.....
3	South Argyle.....	.....	.....	.....	.....	.....	.....
4	Argyle.....	.....	.....	.....	.....	1	.....
5	Colla.....	.....	.....	.....	.....	.....	.....
6	Fly Summit.....	.....	.....	.....	.....	.....	.....
7	North Easton.....	.....	.....	.....	.....	.....	.....
8	North Granville.....	.....	.....	.....	.....	.....	.....
9	Sandy Hill.....	.....	.....	.....	.....	.....	.....
10	South Hartford.....	.....	.....	.....	.....	1	.....
11	Whitehall.....	.....	.....	.....	.....	.....	.....
12	Salem.....	.....	.....	.....	1	.....	.....

WAYNE COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manufacture during one season?	Where do you get your cider or cider-vinegar stock?
		Yes.	No.			
1	Loch Berlin	1	.....	20 years	200 barrels.....	Make it.
2	Chittenango Station.....	1	.....	18 years	9,000 to 15,000 barrels.....	Principally in New York State.
3	Macedon	1	.....	25 years	25 to 100 barrels	Make it.
4	Newark	1	.....	15 years	7,500 barrels.....	Make it.
5	Newark .....	.....	1	.....	.....	.....
6	South Butler	1	.....	.....	6 barrels.....	Make it.
7	Walworth .....	.....	1	Make cider.....	.....	Make it.
8	Alton.	1	.....	.....	1 to 2 barrels	Make it.
9	Lake Side .....	.....	1	.....	.....	.....
10	Lyons	1	.....	.....	1,000 barrels.....	Make it.
11	Lyons .....	.....	1	.....	.....	.....
12	Lyons .....	.....	1	.....	.....	.....
13	North Rose.....	.....	1	.....	.....	Make it.
14	Palmyra.....	1	.....	25 years	20 to 25 barrels	Make it.
15	Williamson.....	1	.....	40 years	2 barrels.....	Make it.

WAYNE COUNTY — (Continued).

Circular number.	POST-OFFICE.	Where is the fruit grown from which the cider or stock you use is made ?	Do you manufacture a uniform or a varying strength of vinegar as to acidity?		If uniform what is the percentage of the acidity?	If of a varying strength, what is the lowest and greatest acidity that you manufacture ?		Do you have any difficulty in producing in pure cider vinegar 4.5% of acidity ?	
			Uniform.	Varying.		Lowest.	Greatest.	Yes.	No.
1	Loch Berlin	Wayne county.....	1	.....	4.5	.....	.....	.....	1
2	Chittanango Station.....	New York and Pennsylvania....	.....	.....	.....	7.73	8.63	.....	1
3	Macedon	Wayne county.....	.....	1	.....	4	7	1	.....
4	Newark	This State, mostly; some from Pennsylvania.	.....	1	.....	4.5	5.5	.....	1
5	Newark .....	.....	.....	.....	.....	.....	.....	.....	.....
6	South Butler	On my farm.....	.....	.....	.....	.....	.....	.....	1
7	Walworth	Towns of Macedon and Walworth.	.....	.....	.....	.....	.....	.....	.....
8	Alton.....	Town of Huron .....	.....	.....	.....	.....	.....	.....	.....
9	Lake Side .....	.....	.....	.....	.....	.....	.....	.....	.....
10	Lyons	Vicinity .....	.....	1	.....	*30	*40	1	.....
11	Lyons .....	.....	.....	.....	.....	.....	.....	.....	.....
12	Lyons .....	.....	.....	.....	.....	.....	.....	.....	.....
13	North Rose.....	Towns of Huron, Rose and Sodus, Wayne county.	1	.....	4.5	.....	.....	.....	.....
14	Palmyra.....	Vicinity .....	.....	1	.....	.....	.....	1	.....
15	Williamson.....	Vicinity .....	.....	.....	.....	.....	.....	.....	.....

* This is undoubtedly an error.

WAYNE COUNTY — (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	Yes.	No.	Yes.	No.
1	Loch Berlin.....	....	....	....	....	....	....
2	Chittenango Station.....	....	....	1	....	....	1
3	Macedon.....	....	....	1	....	....	....
4	Newark.....	....	1	1	....	1	....
5	Newark.....	....	....	....	....	....	....
6	South Butler.....	....	....	....	....	....	....
7	Walworth.....	....	....	....	....	....	....
8	Alton.....	....	....	....	....	....	....
9	Lake Side.....	....	....	....	....	....	....
10	Lyons.....	1	....	1	....	....	....
11	Lyons.....	....	....	....	....	....	....
12	Lyons.....	....	....	....	....	....	....
13	North Rose.....	....	....	1	....	1	....
14	Palmira.....	....	....	1	....	....	....
15	Williamson.....	....	....	....	....	....	....

Think not.
We have not found them to.

They undoubtedly do vary a little.

I have observed that the best grafted fruit makes the best vinegar.

WAYNE COUNTY — (Concluded).

Circular number.		Is there acid in this fruit when it contains acid?		If so, where?		1-3%	4%	Remarks.
1	Loch Berlin .....	....	1	Think not, if properly made.	....	1	....	Keep with as it is; we the the
2	Chittenango Station.	....	....	....	....	1	....	that will do better than that; against lowering the standard
3	Macedon .....	....	....	....	....	....	1	harm to the public to reduce shipping is much stronger.
4	Newark .....	....	1	We have bought apples from all parts of this State, and never found any that would not make 4.5%	....	1	....	enforcement of the pre-ent law; In this State has dated from
5	Newark .....	....	....	....	....	1	....	The present law is very satisfactory and should not be tampered with. I do not deem it wise to reduce the standard; the tendency is to work under the test; I make vinegar to sell; keep the bars up, they will be let down soon
6	South Butler .....	....	....	....	....	1	....
7	Walworth .....	....	....	....	....	....	....	that different apples make different kinds
8	Aiton .....	....	....	....	....	....	....	r tested my vinegar; I can make stronger 'cider' pure cider is too strong
9	Lake Side .....	....	1	There is no such section in this State, where the ripened fruit will not produce 4.5% acetic acid	....	1	....	am a large grower of apples, but have evaporating; the making of adulterated
10	Lyons .....	....	....	....	....	..	1	We believe that 4% acetic acid is enough. It would be a very bad move to reduce the standard, as the best vinegar is none too
11	Lyons .....	....	....	....	....	1	....
12	Lyons .....	....	....	....	....	....	....	oldling it until it made itself; had t could not compete with second-
13	North Rose .....	....	....	....	....	....	....	riest to all the slop vinegar that
14	Palmyra .....	....	....	....	....	....	....	it.
15	Williamson .....	....	....	....	....	....	....	comes good, when I sell it; I test

WESTCHESTER COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar ?		How long have you been such ?	How much do you manufacture during one season ?	Where do you get your cider or cider-vinegar stock ?
		Yes.	No.			
1	Bedford Station.....	1	.....	.....	.....	.....
2	Chappaqua.....	1	.....	31 years	1,000 to 2,000 barrels	Make it.
3	Croton Falls.....	1	.....	6 years	500 gallons.....	Make it.
4	Lewisboro.....	1	.....	22 years	100 barrels.....	Make it.
5	Port Chester	1	.....	20 years	100 to 200 barrels	Make it.
6	White Plains	1	.....	30 years	3,000 to 10,000 barrels	Make it.
7	Tuckahoe	1	.....	5 years	15 barrels.....	Make it.
8	Yorktown Heights	1	.....	6 years	100 barrels.....	Make it.
9	Croton Falls.....	1	.....	30 years	10 or 15 barrels	Make it.
10	Croton Landing	1	.....	20 years .....	.....	Make it.
11	Jefferson Valley.....	1	.....	15 years	1,000 gallons.....	Make it.
12	Katonah.....	1	.....	.....	10 barrels.....	Make it.
13	Somers Centre	1	.....	5 years	800 to 1,000 barrels	Make it.
14	White Plains .....	.....	1	.....	.....	.....

WESTCHESTER COUNTY — (Continued).

[illegible]

WESTCHESTER COUNTY — (Continued)

Circular number	POST-OFFICE	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	Yes.	No.	Yes.	No.
1	Bedford Station						
2	Chappaqua						
3	Croton Falls						
4	Lewlshoro						
5	Port Chester						
6	White Plains						
7	Tuckahoe						
8	Yorktown Heights						
9	Croton Falls						
10	Croton Landing						
11	Jefferson Valley						
12	Katonah						
13	Somers Centre						
14	White Plains						

Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?

Yes. No.

If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?

Yes. No.

Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?

Yes. No.

If so, how?

Late apples have more sugar

Late made will make stronger vinegar, as there is more alcohol in the cider; consequently more acid when converted.

Winter apples are best for vinegar: "Westchester Co. Russet" yields the largest per cent of sugar of any apple I know of.

Late, round apples are the best for cider or vinegar.

Early apples will not make good vinegar; fruit which lies on the ground and becomes withered will not make good vinegar.

Think not, only that most early varieties contain less sugar than later sorts

Apples on light, loamy soil have more saccharine matter; the sweeter the apple the stronger the vinegar; flavor not so nice.

Westchester county apples go ahead of the State.

Westchester county apples go ahead of the State.

Westchester county apples go ahead of the State.

Westchester county apples go ahead of the State.

Westchester county apples go ahead of the State.

Westchester county apples go ahead of the State.

Westchester county apples go ahead of the State.

NEW YORK STATE DAIRY COMMISSIONER.

WESTCHESTER COUNTY — (Concluded).

Circular number.	POST-OFFICE.	Is there a fruit in this lot which will not produce a vinegar containing 4.5 per cent of acetic acid?		If so, where?	4 1/2%.	4%.	Remarks.
		Yes.	No.				
1	Bedford Station.....	.....	.....	.....	.....	.....	I am not posted on the vinegar question. I manufacture a small quantity by the old process; have no way to test it; September apples and vinegar from second pressings lack strength.
2	Chappaqua.....	.....	.....	.....	1	.....	one in making an average made the standard, and
3	Croton Falls.....	.....	.....	.....	.....	.....	a pure cider; it does not
4	Lewisboro.....	1	.....	Think it will fall below the average of 4.5%.	.....	1	a market.
5	Port Chester.....	.....	.....	.....	3	.....	State; very few know
6	White Plains.....	.....	.....	.....	1	.....	id the retailer should be
7	Tuckahoe.....	.....	.....	.....	.....	.....	years, will show at least
8	Yorktown Heights.....	.....	.....	.....	.....	.....	ted vinegar at a much
9	Croton Falls.....	.....	.....	.....	1	.....	we do trouble selling all
10	Croton Landing.....	1	.....	There is a difference in the amount of saccha- rine matter contained in fruit from different sections of the State.	.....	.....	d around here, and do not have any fault found as
11	Jefferson Valley.....	.....	.....	.....	.....	.....	trouble.
12	Katonah.....	.....	.....	.....	.....	.....	should not be reduced; good cider vinegar should
13	Somers Centre.....	.....	.....	.....	.....	.....	I, in part, prohibitory to the small manufacturer;
14	White Plains.....	.....	.....	.....	1	.....	vinegar on that account.
							I have not sufficient knowledge to say any thing in regard to acid strength; when mine
							is strong enough to suit my customers I sell it without testing.
							Am not interested as it makes no difference to me; my vinegar will stand at more than
							4% or 4 1/2%, as it has to be used two parts vinegar and one part water or it will
							up pickles.
							Keep up the standard

WYOMING COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manufacture during one season?	Where do you get your cider or cider-vinegar stock?
		Yes.	No.			
1	Bennington	1	.....	Seven years	10 to 20 barrels	Make it.
2	Castile .....	.....	1	.....	.....	.....
3	Eagle Village.....	1	.....	18 years	500 barrels.....	Make it.
4	Perry Centre.....	.....	1	.....	.....	.....

WYOMING COUNTY — (Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	Yes.	No.	Yes.	No.
1	Bennington .....	....	....	....	....	....	....
2	Castile .....	....	....	....	....	....	....
3	Eagle Village.....	....	1	1	....	....	1
4	Perry Center .....	....	....	....	....	....	....

WYOMING COUNTY — (Concluded).

Circular number	POST-OFFICE.	I.			4½% 4%.		Remarks.
		Yes.	No.	If so, where?			
1	Bennington .....	.....	.....	.....	.....	.....	.....
2	Castile.....	.....	.....	.....	.....	.....	.....
3	Eagle Village .....	.....	.....	.....	1	.....	.....
4	Perry Center.....	.....	.....	.....	.....	.....	.....

The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.

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YATES COUNTY.

Circular number.	POST-OFFICE.	Are you a manufacturer of cider vinegar?		How long have you been such?	How much do you manufacture during one season?	Where do you get your cider or cider-vinegar stock?
		Yes.	No.			
1	Penn Yan.....	1	.....	8 years	10 to 50 barrels	Make it.
2	Rushville.....	1	.....	15 years	1 to 5 casks	Make it.
3	Dundee.....	1	.....	1 year	2,250 gallons.....	Make it.
4	Italy	1	.....	.....	10 to 20 barrels	Make it.
5	Starkey	1	.....	12 years	1 to 2 barrels	Make it.

YATES COUNTY.—(Continued).

Circular number.	POST-OFFICE.	If you have difficulty, is it due to any particular condition of the fruit or the time or place of its growth?		Does the time of the year in which the apples ripen have anything to do with the amount of acetic acid they will produce?		Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?	
		Yes.	No.	If so, what are those conditions?	Yes.	No.	If so, how.
1	Penn Yan.....	1	....	With good, ripe apples I have no trouble; with those sorted from evaporating apples I do.	1	....	As to parts of the State, I do not know; soil makes a difference; the richer the land the stronger the vinegar.
2	Rushville.....	1	....	Have had no trouble until last season, which was backward and slow to make vinegar.	1	....	.....
3	Dundee.....	1	....	Matured fruit produces a greater percentage of acetic acid than earlier gathered fruit.	1	....	The variance is due to climate and soil.
4	Italy.....	....	....	.....	....	....	.....
5	Starkey.....	....	....	.....	....	....	.....

YATES COUNTY -- (Concluded).

Circular number	Is there any acid in this State fruit will not containing 4.5 per cent of acetic acid?		If so, where?		The law of this State requires that vinegar sold upon the market shall contain at least 4.5 per cent of acetic acid. An effort has been and is still being made to reduce the standard to 4 per cent of acetic acid. What are your views as to this proposed change? Please state them fully.	Remarks
	Yes.	No.			4 1/2 % 4 %	
1	Penn Yan		1	pure cider vinegar manu- fact strength, put upon the ed products; if the present th vinegar it is not wise to
2	Rushville .....	...	.....		1
3	Dundee .....	...	.....		1
4	Italy.....	...	.....		...
5	Starkey .....	...	.....		...

SUMMARY OF REPLIES
TO
VINEGAR CIRCULAR.

SUMMARY OF REPLIES TO VINEGAR CIRCULAR.

COUNTY.	Are you a manufacturer of cider vinegar?		Total number of barrels made.	Uniform or varying strength of vinegar as to acidity.		Varying strength—Percentage acetic acid.		Difficulty in producing 4.5% acidity.		Is the difficulty due to any particular condition of the fruit, or time or place of its growth?		Does the time of year in which apples ripen have any thing to do with the amount of acetic acid they will produce?		Number of answers returned.
	Yes.	No.		Uniform.	Varying.	Lowest.	Highest.	Yes.	No.	Yes.	No.	Yes.	No.	
Albany.....	12	1	17,953	1	10	3	5.25	10	2	10	.....	10	.....	13
Allegany.....	4	4	945	1	4	4.5	4.5	1	3	1	.....	5	1	8
Broome.....	8	.....	1,022	2	3	.....	.....	1	1	2	.....	3	2	8
Cattaraugus.....	5	1	284	1	1	.....	.....	1	1	1	.....	2	.....	6
Cayuga.....	14	.....	1,083	3	6	4.5	.....	4	6	4	.....	10	1	15
Chautauqua.....	13	5	3,421	6	7	3.5	5.5	4	7	4	.....	8	1	18
Chemung.....	3	1	18	1	1	.....	.....	1	1	1	.....	2	.....	4
Chenango.....	8	1	185	2	1	.....	.....	.....	.....	1	.....	4	1	9
Clinton.....	6	.....	552	3	2	.....	.....	.....	.....	1	.....	1	.....	6
Columbia.....	10	2	6,249	3	5	.....	.....	.....	.....	1	.....	7	.....	12
Cortland.....	7	.....	1,103	1	6	4.5	8	4	2	3	.....	1	.....	7
Delaware.....	4	.....	640	.....	2	.....	.....	.....	.....	.....	.....	3	.....	5
Dutchess.....	9	3	1,298	1	6	.....	5.6	.....	.....	.....	.....	6	1	12
Erie.....	20	4	17,046	3	7	4	9	1	8	2	.....	6	6	24
Essex.....	4	.....	954	1	2	4	5	.....	.....	.....	.....	2	.....	4
Franklin.....	1	.....	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Fulton.....	5	.....	428	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	5
Genesee.....	5	1	4,310	3	3	4.2	.....	.....	.....	.....	.....	.....	.....	6
Greene.....	6	1	595	2	3	.....	.....	.....	.....	.....	.....	.....	.....	7
Herkimer.....	4	1	329	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	5
Jefferson.....	5	1	802	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	6
Kings.....	2	5	18,400	.....	2	4.22	4.65	.....	.....	.....	.....	.....	.....	7
Livingston.....	9	3	1,881	3	4	3.5	7	.....	.....	.....	.....	.....	.....	12
Madison.....	5	3	53,107	2	2	3.5	5	.....	.....	.....	.....	.....	.....	18
Monroe.....	7	1	35,982	1	9	4	6	.....	.....	.....	.....	.....	.....	14
Montgomery.....	4	.....	11,700	2	4	3.72	7.14	.....	.....	.....	.....	.....	.....	4
New York.....	2	6	1,600	1	3	.....	.....	.....	.....	.....	.....	.....	.....	8
Niagara.....	11	5	2,835	3	5	.....	6.25	.....	.....	.....	.....	.....	.....	16
Oneida.....	16	.....	4,213	8	4	4	5.5	.....	.....	.....	.....	.....	.....	16

SUMMARY OF REPLIES TO VINEGAR CIRCULAR — (Continued).

COUNTY.	Are you a manufacturer of cider vinegar?		Total number of barrels made.	Uniform or varying strength of vinegar as to acidity.		Varying strength—Percentage acetic acid.		Difficulty in producing 4.5% acidity.		Is the difficulty due to any particular condition of the fruit, or time or place of its growth?		Does the time of year in which apples ripen have any thing to do with the amount of acetic acid they will produce?		Number of answers returned.
	Yes.	No.		Uniform.	Varying.	Lowest.	Highest.	Yes.	No.	Yes.	No.	Yes.	No.	
Onondaga	8	8	1,247	2	5	3.5	6	4	5	3	5	8	...	16
Ontario	8	2	543	2	4	4	4.8	3	3	3	3	7	...	10
Orange	8	1	576	4	3	3.2	6.7	2	3	1	1	5	...	9
Orleans	7	*3	84,235	1	3	3	6.5	1	6	2	5	6	...	10
Oswego	12	3	8,235	1	6	3	5.5	4	2	3	3	7	...	16
Otsego	7	...	1,310	1	5	...	...	...	1	...	...	...	...	7
Queens	6	...	405	...	2	...	...	...	1	...	...	...	...	6
Rensselaer	14	...	1,390	6	3	3.75	7.5	2	1	...	...	...	...	14
Rockland	4	...	1,364	1	6	3.5	5.5	4	6	5	3	...	...	4
St. Lawrence	3	1	45	2	2	3.5	4.5	1	1	2	...	...	...	4
Saratoga	8	2	4,249	1	3	...	...	...	...	...	...	...	...	10
Schenectady	3	...	1,411	...	...	...	...	...	2	...	...	...	...	3
Schoharie	9	...	1,201	2	5	3.23	5	3	1	...	...	...	...	9
Schuyler	5	...	8,077	2	...	...	...	...	1	...	...	...	...	5
Seneca .....	...	1	...	...	1	...	...	...	1	...	...	...	...	1
Steuben	8	3	232	3	6	3.5	6	2	4	...	...	...	...	11
Suffolk	5	...	2,232	1	3	3	6	2	3	...	...	...	...	5
Sullivan	5	1	207	1	2	...	...	1	2	...	...	...	...	6
Tioga	5	...	50	2	...	...	...	1	1	...	...	...	...	5
Tompkins	6	1	46	2	2	3.5	5.6	1	1	...	...	...	...	7
Ulster	10	5	3,023	1	7	3.5	5.5	4	5	...	...	...	...	15
Warren	5	3	220	2	1	...	...	2	1	...	...	...	...	8
Washington	12	...	246	2	6	...	...	1	3	...	...	...	...	12
Wayne	9	6	28,835	2	4	...	...	3	1	...	...	...	...	15
Westchester	13	1	13,487	4	3	4	8.63	1	4	...	...	...	...	14
Wyoming	2	2	520	1	...	4.5	7	...	4	...	...	...	...	4
Yates	5	...	143	1	2	4	7	...	1	...	...	...	...	5

* Two, of the three not manufacturing, represent 1,900 barrels, of which one, representing 1,000 barrels, is against a change.

SUMMARY OF REPLIES TO VINEGAR CIRCULAR — (Continued).

Against and for the proposed change.

Against.	For.	Summary.
2	8	
4	8	
2	8	
3	.....
7	6	
5	6	
2	1	
4	2	
3	1	
5	5	
2	2	

NOTE.—The term "no expression," as used in this summary, means no positive opinion expressed as to the proposed change.

Number of answers returned. 13 3 3 6 13 13 4 9 6 13 7

NINTH ANNUAL REPORT OF THE

COUNTY.	Will apples grown in different parts of the State vary in the amount of acetic acid they will produce?			Is there any apple-growing section in this State where the ripened fruit will not produce 4.5 per cent acetic acid?			Against and for proposed change.		Summary.
	Yes.	No.	Unanswered.	Yes.	No.	Unanswered.	Against.	For.	
Delaware.....	5	5	1	One, not stating amount, against change; four, representing 640 barrels, no expression.
Dutchess.....	.....	.....	18	1	1	10	2	4
Erie.....	6	5	13	1	2	20	11	2	
Essex.....	1	1	2	.....	1	3	2	.....
Franklin.....	.....	.....	1	.....	.....	1	.....	.....
Fulton.....	1	1	3	1	.....	4	.....	2
Genesee.....	1	1	4	1	3	2	4	2	
Greene.....	.....	1	6	.....	1	6	1	3
Herkimer.....	1	.....	4	.....	1	4	2	.....
Jefferson.....	2	.....	4	.....	.....	6	1	3
Kings.....	3	.....	4	2	1	4	3	3
Livingston.....	2	1	9	1	1	10	3	2	
Number of answers returned.	5	12	24	4	1	5	12	12	

18	Madison	3	4	11	2	5	11	6	4
14	Monroe .....	.....	4	10	.....	4	10	5	2
4	Montgomery	1	.....	3	1	1	2	.....	2
8	New York	3	1	4	1	1	6	6	1
16	Niagara .....	.....	2	14	2	5	9	10	2
16	Oneida	3	4	9	1	7	8	7	2
16	Onondaga	1	3	12	2	2	12	6	2
10	Ontario	2	1	7	1	.....	9	3	4
9	Orange	2	.....	7	.....	.....	9	4	3
10	Orleans	1	2	7	1	2	7	5	3
16	Oswego	1	.....	15	1	1	14	4	5
7	Otsego .....	.....	.....	7	.....	.....	7	2	.....
6	Queens	2	.....	4	1	1	4	2	2
14	Rensselaer	2	2	9	1	1	12	5	7
4	Rockland	1	1	2	2	.....	2	2	.....

6	Warren.....	1	1	6	.....	6	.....	6	2	3
12	Washington.....	3	1	6	.....	12	.....	1	1	3
16	Wayne.....	2	2	11	.....	12	3	7	2	2
14	Westchester.....	2	1	11	2	12	.....	5	1	1
	Wyoming.....	.....	.....	4	1	3	.....	1	.....	.....
5	Yates.....	1	.....	4	.....	5	.....	.....	.....	3

Statement in Relation to the Replies to the Vinegar Circular.

The whole number of replies received from manufacturers,
or those interested in the manufacture of vinegar was.... 507

From four counties—Hamilton, Lewis, Putnam and Rich-
mond—no replies were received.

Whole number of barrels of vinegar manufactured, 288,082.

Whole number manufacturing uniform strength 106

Whole number manufacturing varying strength 187

The following are the percentages of acetic acid strength, given
as uniform, in different parts of the State: 4, 4.5, 5, 5.5, 5.96,
6.5, 6.68 and 18.*

The lowest percentage of acetic acid is 2

The highest percentage of acetic acid is 9

Having difficulty in producing 4.5 per cent acetic acid 108

Having no difficulty in producing 4.5 per cent acetic acid ... 140

Not answering 259

Difficulty being due to particular condition of the fruit, or

the time or place of its growth 109

Not being due to such condition 63

Not answering 335

Believing the time of year in which fruit ripens affects the

amount of acetic acid produced 240

Believing this condition has nothing to do with amount of

acetic acid produced 49

Not answering 218

* This is evidently erroneous.

Believing that apples grown in different parts of the State vary in amount of acetic acid produced	82
Believing part of State in which grown has nothing to do with the amount of acetic acid produced.....	59
Not answering	368
Believing there are different apple-growing sections in the State where the ripened fruit will not produce a vinegar containing 4.5 per cent acetic acid	48
Believing there are no such sections, under like conditions, which will not produce 4.5 per cent acetic acid	58
Not answering	401
One hundred and seventy-nine — 130 representing 210,281 barrels and forty-nine not stating amount made — were in favor of 4.5 per acetic acid.	
One hundred and twenty-seven — 100 representing 38,650 barrels and twenty-seven not stating amount made — were in favor of a reduction of the standard.	
Two hundred and one — 127 representing 39,151 barrels and seventy-four not stating amount made — expressed no opinion as to the standard.	

L A W S

RELATIVE TO

DAIRY PRODUCTS.

LAWS RELATING TO DAIRY PRODUCTS.

Chapter 202.

An Act to prevent deception in sales of dairy products.

PASSED April 24, 1884; three-fifths being present.

The People of the State of New York, represented in Senate and Assembly, do enact as follows.

(Amended by section 1 of chapter 577 of the Laws of 1886, and chapter 223 of the Laws of 1887.)

Section 1. No person or persons shall sell or exchange, or expose for sale or exchange, any unclean, impure, unhealthy, adulterated, or unwholesome milk, or shall offer for sale any article of food made from the same or of cream from the same. This provision shall not apply to pure skim cheese made from milk which is clean, pure, healthy, wholesome and unadulterated, except by skimming. Whoever violates the provisions of this section is guilty of a misdemeanor and shall be punished by a fine of not less than twenty-five nor more than two hundred dollars, or by imprisonment of not less than one or more than six months, or both such fine and imprisonment for the first offense, and by six months' imprisonment for each subsequent offense.

(Section 2 of chapter 183 of the Laws of 1885, practically substituted.)

§ 2. No person shall keep cows for the production of milk for market, or for sale or exchange, or for manufacturing the same, or cream from the same, into articles of food, in a crowded or unhealthy condition, or feed the cows on food that is unhealthy, or that produces impure, unhealthy, diseased or unwholesome milk. No person shall manufacture from impure, unhealthy, diseased, or unwholesome milk, or of cream from the same, any article of food. Whoever violates the provisions of this section is guilty of a mis-

demeanor and shall be punished by a fine of not less than twenty-five nor more than two hundred dollars, or by imprisonment of not less than one or more than four months, or by both such fine and imprisonment for the first offense, and by four months imprisonment for each subsequent offense.

(Section 3 of chapter 183 of the Laws of 1885, practically substituted.)

§ 3. No person or persons shall sell, supply, or bring to be manufactured to any butter or cheese manufactory, any milk diluted with water, or any unclean, impure, unhealthy, adulterated, or unwholesome milk, or milk from which any cream has been taken (except pure skim milk to skim cheese factories), or shall keep back any part of the milk commonly known as "strippings," or shall bring or supply milk to any butter or cheese manufactory that is sour (except pure skim milk to skim cheese factories). No butter or cheese manufactories, except those who buy all the milk they use, shall use for their own benefit, or allow any of their employees or any other person to use, for their own benefit, any milk, or cream from the milk, or the product thereof brought to said manufactories, without the consent of the owners thereof. Every butter or cheese manufacturer, except those who buy all the milk they use, shall keep a correct account of all the milk daily received, and of the number of pounds and packages of butter, the number and aggregate weight of cheese made each day, the number of packages of cheese and butter disposed of, which shall be open to inspection to any person who delivers milk to such manufacturer. Whoever violates the provisions of this section shall be guilty of a misdemeanor and shall be punished for each offense by a fine of not less than twenty-five or more than two hundred dollars, or not less than one or more than six months' imprisonment, or both such fine and imprisonment.

(Section 4 of chapter 183 of the Laws of 1885, practically substituted.)

§ 4. No manufacturer of vessels for the package of butter shall sell or dispose of any such vessels without branding his name and

the true weight of the vessel or vessels on the same with legible letters or figures not less than one-fourth of an inch in length. Whoever violates the provisions of this section is guilty of a misdemeanor and shall be punished for each offense by a fine of not less than fifty nor more than one hundred dollars, or by imprisonment of not less than thirty or more than sixty days, or by both such fine and imprisonment.

(Section 5 of chapter 183 of the Laws of 1885, practically substituted.)

§ 5. No person shall sell or offer or expose for sale any milk except in the county from which the same is produced, unless each can, vessel or package containing such milk shall be distinctly and durably branded with letters not less than one inch in length, on the outside, above the center, on every can, vessel or package containing such milk, the name of the county from which the same is produced, and the same mark shall be branded or painted in a conspicuous place on the carriage or vehicle in which the milk is drawn to be sold, and such milk can only be sold in or retailed out of a can, vessel, package or carriage so marked. Whoever violates the provisions of this section shall be guilty of a misdemeanor, and shall be punished by a fine of not less than twenty-five nor more than two hundred dollars, or not less than two months' or more than four months' imprisonment, or both such fine and imprisonment for the first offense, and by four months' imprisonment for each subsequent offense.

(Section 6 of chapter 183 of the Laws of 1885, practically substituted.)

§ 6. No person shall manufacture out of any oleaginous substance or substances, or any compound of the same, other than that produced from unadulterated milk, or cream from the same, any article designed to take the place of butter or cheese produced from pure, unadulterated milk or cream of the same, or shall sell, or offer for sale, the same as an article of food. This provision shall not apply to pure skim-milk cheese made from pure skim milk. Whoever violates the provisions of this section shall be guilty of a misde-

meanor, and be punished by a fine of not less than one hundred or more than five hundred dollars, or not less than six months' or more than one year's imprisonment, or by both such fine and imprisonment, for the first offense, and by imprisonment for one year for each subsequent offense.

(Section 10 of chapter 183 of the Laws of 1885, practically substituted.)

§ 7. No person shall offer, sell or expose for sale in full packages, butter or cheese branded or labeled with a false brand or label as to county or state in which the article is made. Whoever violates the provisions of this section is guilty of a misdemeanor, and shall be punished by a fine of not less than twenty-five or more than fifty dollars, or imprisonment of not less than fifteen or more than thirty days, for the first offense, and fifty dollars or thirty days' imprisonment for each subsequent offense.

(Section 11 of chapter 183 of the Laws of 1885, practically substituted.)

§ 8. No person shall manufacture, sell or offer for sale, any condensed milk unless the same shall be put up in packages, upon which shall be distinctly labeled or stamped the name or brand by whom or under which the same is made. No condensed milk shall be made or offered for sale unless the same is manufactured from pure, clean, healthy, fresh, unadulterated and wholesome milk, from which the cream has not been removed; or unless the proportion of milk solids contained in the condensed milk shall be in amount the equivalent of twelve per centum of milk solids in crude milk, and of such solids twenty-five per centum shall be fat. When condensed milk shall be sold from cans or packages not hermetically sealed, the vendor shall brand or label such cans or packages with the name of the county or counties from which the same was produced, and the name of the vendor. Whoever violates the provisions of this section shall be guilty of a misdemeanor, and be punished by a fine of not less than fifty or more than five hundred dollars, or by imprisonment of not more than six months, or both such fine and imprisonment for the first

offense, and by six months' imprisonment for each subsequent offense.

(Section 12 of chapter 183 of the Laws of 1885, practically substituted.)

§ 9. The governor, by and with the advice and consent of the senate, shall appoint a commissioner, who shall be known as the New York state dairy commissioner, who shall be a citizen of this state, and who shall hold his office for the term of two years, or until his successor is appointed, and shall receive a salary of three thousand dollars per annum and his necessary expenses incurred in the discharge of his official duties under this act; said commissioner shall be appointed within ten days after the passage of this act, and shall be charged, under the direction of the governor, with the enforcement of the various provisions thereof. Said commissioner may be removed from office at the pleasure of the governor, and his successor appointed as above provided for.

The said commissioner is hereby authorized and empowered to appoint such assistant commissioners and to employ such experts, chemists, agents and such counsel as may be deemed by him necessary for the proper enforcement of this law. The compensation to be fixed by the commissioner.

The said commissioner is also authorized to employ a clerk at an annual salary of not to exceed twelve hundred dollars.

The sum of thirty thousand dollars is hereby appropriated to be paid for such purpose out of any moneys in the treasury not otherwise appropriated. All charges, accounts and expenses authorized by this act shall be paid by the treasurer of the state, upon the warrant of the comptroller. The entire expenses of said commissioner shall not exceed the sum appropriated for the purposes of this act.

The said commissioner shall make annual reports to the legislature, not later than the fifteenth day of January of each year, of his work and proceedings, and shall report in detail the number of assistant commissioners, experts, chemists, agents and counsel he has employed, with their expenses and disbursements. The said commissioner shall have a room in the new capitol, to be set apart for his use by the capitol commissioner.

(Section 12 of chapter 183 of the Laws of 1885, practically substituted.)

§ 10. The said commissioner and assistant commissioners, and such experts, chemists, agents and counsel as they shall duly authorize for the purpose, shall have full access, egress and ingress to all places of business, factories, farms, buildings, carriages, cars, vessels and cans used in the manufacture and sale of any dairy products or any imitation thereof. They shall also have power and authority to open any package, can or vessel containing such articles which may be manufactured, sold or exposed for sale in violation of the provisions of this act, and may inspect the contents therein and may take therefrom samples for analyses.

(Section 14 of chapter 183 of the Laws of 1885, practically substituted.)

§ 11. Courts of special sessions shall have jurisdiction of all cases arising under this act, and their jurisdiction is hereby extended so as to enable them to enforce the penalties imposed by any or all of the sections hereof.

(Section 15 of chapter 183 of the Laws of 1885, practically substituted.)

§ 12. In all prosecutions under this act the costs thereof shall be paid out of the fine, if one is collected; if not, the same shall be paid in the manner now provided for by law, and the rest of the fine shall be paid to the state treasurer.

(Section 16 of chapter 183 of the Laws of 1885, practically substituted.)

§ 13. In all prosecutions under this act, relating to the sale and manufacture of unclean, impure, unhealthy, adulterated or unwholesome milk, if the milk be shown to contain more than eighty-eight per centum of water or fluids or less than twelve per centum of milk solids, which shall contain not less than three per centum of fat, it shall be declared adulterated, and milk drawn from cows within fifteen days before and five days after parturition, or from animals fed on distillery waste, or any substance in

the state of putrefaction, or fermentation, or upon any unhealthy food whatever, shall be declared unclean, impure, unhealthy and unwholesome milk. This section shall not prevent the feeding of ensilage from silos.

(Section 17 of chapter 183 of the Laws of 1885, practically substituted.)

§ 14. The doing of anything prohibited being done, and the not doing of anything directed to be done in this act shall be presumptive evidence of a willful intent to violate the different sections and provisions hereof.

§ 15. Chapters four hundred and sixty-seven of the laws of eighteen hundred and sixty-two, five hundred and forty-four and five hundred and eighteen of the laws of eighteen hundred and sixty-four, five hundred and fifty-nine of the laws of eighteen hundred and sixty-five, four hundred and fifteen of the laws of eighteen hundred and seventy-seven, two hundred and twenty and two hundred and thirty-seven of the laws of eighteen hundred and seventy-eight, four hundred and thirty-nine of the laws of eighteen hundred and eighty, and two hundred and fourteen of the laws of eighteen hundred and eighty-two, are hereby repealed.

§ 16. This act shall take effect on the first day of June, eighteen hundred and eighty-four, except as otherwise provided therein.

Chapter 183.

An Act to prevent deception in the sale of dairy products, and to preserve the public health, being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled "An act to prevent deception in sales of dairy products."

PASSED April 30, 1885; three-fifths being present.

The People of the State of New York, represented in Senate and Assembly, do enact as follows.

(Amended by chapter 223 of Laws of 1887.)

Section 1. No person or persons shall sell or exchange, or expose for sale or exchange, any unclean, impure, unhealthy,

adulterated or unwholesome milk, or shall offer for sale any article of food made from the same, or of cream from the same. The provisions of this section shall not apply to skim milk sold to bakers or to housewives for their own use or manufacture, upon written orders for the same, nor to skim milk sold for use in the county in which it is produced. This provision shall not apply to pure skim cheese made from milk which is clean, pure, healthy, wholesome and unadulterated, except by skimming. Whoever violates the provisions of this section is guilty of a misdemeanor, and shall be punished by a fine of not less than twenty-five dollars nor more than two hundred dollars, or by imprisonment of not less than one month or more than six months, or both such fine and imprisonment for the first offense, and by six months' imprisonment for each subsequent offense.

§ 2. No person shall keep cows for the production of milk for market, or for sale or exchange, or for manufacturing the same, or cream from the same, into articles of food, in a crowded or unhealthy condition, or feed cows on food that is unhealthy, or that produces impure, unhealthy, diseased or unwholesome milk. No person shall manufacture from impure, unhealthy, diseased or unwholesome milk, or of cream from the same, any article of food. Whoever violates the provisions of this section is guilty of a misdemeanor and shall be punished by a fine of not less than twenty-five dollars nor more than two hundred dollars, or by imprisonment of not less than one month or more than four months, or by both such fine and imprisonment for the first offense, and by four months' imprisonment for each subsequent offense.

§ 3. No person or persons shall sell, supply or bring to be manufactured to any butter or cheese manufactory, any milk diluted with water or any unclean, impure, unhealthy, adulterated or unwholesome milk, or milk from which any cream has been taken (except pure skim milk to skim cheese factories), or shall keep back any part of the milk commonly known as "strippings," or shall bring or supply milk to any butter or cheese manufactory that is sour (except pure skim milk to skim cheese factories). No butter or cheese manufactories, except those who buy all the milk

they use, shall use for their own benefit, or allow any of their employees or any other person to use for their own benefit, any milk, or cream from the milk, or the product thereof, brought to said manufactories without the consent of the owners thereof. Every butter or cheese manufacturer, except those who buy all the milk they use shall keep a correct account of all the milk daily received, and of the number of packages of butter and cheese made each day, and the number of packages and aggregate weight of cheese and butter disposed of each day, which account shall be open to inspection to any person who delivers milk to such manufacturer. Whoever violates the provisions of this section shall be guilty of a misdemeanor, and shall be punished for each offense by a fine of not less than twenty-five dollars or more than two hundred dollars, or not less than one month or more than six months' imprisonment, or by both such fine and imprisonment.

§ 4. No manufacturer of vessels for the package of butter shall sell or dispose of any such vessels without branding his name and the true weight of the vessel or vessels on the same, with legible letters or figures not less than one-fourth of an inch in length. Whoever violates the provisions of this section is guilty of a misdemeanor, and shall be punished for each offense by a fine of not less than fifty dollars nor more than one hundred dollars, or by imprisonment of not less than thirty days or more than sixty days, or by both such fine and imprisonment.

§ 5. No person shall sell, or offer or expose for sale, any milk except in the county from which the same is produced, unless each can, vessel or package containing such milk shall be distinctly and durably branded with letters not less than one inch in length, on the outside above the center, on every can, vessel or package containing such milk, the name of the county from which the same is produced; and the same marks shall be branded or painted in a conspicuous place on the carriage or vehicle in which the milk is drawn to be sold; and such milk can only be sold in, or retailed out of a can, vessel, package or carriage so marked. Whoever violates the provisions of this section shall be guilty of a misdemeanor, and shall be punished by a fine of not less than twenty-

five dollars nor more than two hundred dollars, or not less than two months' or more than four months' imprisonment, or both such fine and imprisonment, for the first offense, and by four months' imprisonment for each subsequent offense.

INVALID—(PEOPLE v. MARX.)

§ 6. No person shall manufacture out of any oleaginous substance or substances, or any compound of the same, other than that produced from unadulterated milk, or of cream from the same, any article designed to take the place of butter or cheese produced from pure unadulterated milk or cream of the same, or shall sell, or offer for sale, the same as an article of food. This provision shall not apply to pure skim-milk cheese, made from pure skim-milk. Whoever violates the provisions of this section shall be guilty of a misdemeanor, and be punished by a fine of not less than two hundred dollars nor more than five hundred dollars, or not less than six months' or more than one year's imprisonment, or both such fine and imprisonment for the first offense, and by imprisonment for one year for each subsequent offense.

(Amended by section 2 of chapter 577 of Laws of 1886.)

§ 7. No person by himself or his agents or servants shall render or manufacture out of any animal fat or animal or vegetable oils not produced from unadulterated milk or cream from the same, any article or product in imitation or semblance of or designed to take the place of natural butter or cheese produced from pure unadulterated milk or cream of the same, nor shall he or they mix, compound with, or add to milk, cream or butter any acids or other deleterious substance or any animal fats or animal or vegetable oils not produced from milk or cream, with design or intent to render, make or produce any article or substance or any human food in imitation or semblance of natural butter or cheese, nor shall he sell, keep for sale, or offer for sale any article, substance or compound made, manufactured or produced in violation of the provisions of this section, whether such article, substance or compound shall be made or produced in this state or in any other state or country. Whoever violates the provisions of this section shall be guilty of a misdemeanor and be punished by a fine of

not less than two hundred dollars nor more than five hundred dollars, or not less than six months' or more than one years' imprisonment for the first offense, and by imprisonment for one year for each subsequent offense. Nothing in this section shall impair the provisions of section six of this act.

(Amended by section 3 of chapter 577 of Laws of 1886.)

§ 8. No person shall manufacture, mix or compound with or add to natural milk, cream or butter any animal fats or animal or vegetable oils, nor shall he make or manufacture any oleaginous substance not produced from milk or cream, with intent to sell the same for butter or cheese made from unadulterated milk or cream, or have the same in his possession, or offer the same for sale with such intent, nor shall any article or substance or compound so made or produced, be sold for butter or cheese, the product of the dairy. If any person shall coat, powder or color with annatto or any coloring matter whatever butterine or oleomargarine, or any compounds of the same or any product or manufacture made in whole or in part from animal fats or animal or vegetable oils not produced from unadulterated milk or cream whereby the said product, manufacture or compound shall be made to resemble butter or cheese, the product of the dairy, or shall have the same in his possession, or shall sell or offer for sale or have in his possession any of the said products which shall be colored or coated in semblance of or to resemble butter or cheese, it shall be conclusive evidence of an intent to sell the same for butter or cheese, the product of the dairy. Whoever violates any of the provisions of this section shall be guilty of a misdemeanor, and be punished by a fine of not less than two hundred dollars nor more than one thousand dollars. This section shall not be construed to impair or affect the prohibitions of sections six and seven of this act.

§ 9. Every manufacturer of full-milk cheese may put a brand upon each cheese indicating "full-milk cheese," and the date of the month and year when made; and any person using this brand upon any cheese made from which any cream whatever has been taken shall be guilty of a misdemeanor, and shall be punished for

each offense by a fine of not less than one hundred dollars nor more than five hundred dollars.

§ 10. No person shall offer, sell or expose for sale in full packages, butter or cheese branded or labeled with a false brand or label as to county or state in which the article is made. Whoever violates the provisions of this section is guilty of a misdemeanor, and shall be punished by a fine of not less than twenty-five dollars or more than fifty dollars, or imprisonment of not less than fifteen days or more than thirty days for the first offense, and fifty dollars or thirty days' imprisonment for each subsequent offense.

§ 11. No person shall manufacture, sell or offer for sale any condensed milk, unless the same shall be put up in packages upon which shall be distinctly labeled or stamped the name, or brand, by whom or under which the same is made. No condensed milk shall be made, or offered for sale, unless the same is manufactured from pure, clean, healthy, fresh, unadulterated and wholesome milk, from which the cream has not been removed, or unless the proportion of milk solids contained in the condensed milk shall be in amount the equivalent of twelve per centum of milk solids in crude milk, and of such solids twenty-five per centum shall be fat. When condensed milk shall be sold from cans, or packages not hermetically sealed, the vendor shall brand or label such cans or packages with the name of the county or counties from which the same was produced, and the name of the vendor. Whoever violates the provisions of this section shall be guilty of a misdemeanor, and be punished by a fine of not less than fifty dollars or more than five hundred dollars, or by imprisonment of not more than six months, or by both such fine and imprisonment for the first offense, and by six months' imprisonment for each subsequent offense.

§ 12. Upon the expiration of the term of office of the present commissioner, the governor, by and with the advice and consent of the senate, shall appoint a commissioner, who shall be known as the New York state dairy commissioner, who shall be a citizen of this state, and who shall hold his office for the term of two years, or until his successor is appointed, and shall receive a salary of

three thousand dollars per annum, and his necessary expenses incurred in the discharge of his official duties under this act. Said commissioner shall be charged, under the direction of the governor, with the enforcement of the various provisions thereof, and with all laws prohibiting or regulating the adulteration of butter, cheese or milk. The said commissioner is hereby authorized and empowered to appoint such assistant commissioners and to employ such experts, chemists, agents and such counsel as may be deemed by him necessary for the proper enforcement of this law, their compensation to be fixed by the commissioner. The said commissioner is also authorized to employ a clerk at an annual salary not to exceed twelve hundred dollars. The sum of fifty thousand dollars is hereby appropriated, to be paid for such purpose out of any moneys in the treasury not otherwise appropriated. All charges, accounts and expenses authorized by this act shall be paid by the treasurer of the state upon the warrant of the comptroller, after such expenses have been audited and allowed by the comptroller. The entire expenses of said commissioner shall not exceed the sum appropriated for the purposes of this act. The said commissioner shall make annual reports to the legislature, on or before the fifteenth day of January of each year, of his work and proceedings, and shall report in detail the number of assistant commissioners, experts, chemists, agents and counsel he has employed, with their expenses and disbursements. The said commissioner shall have a room in the new capitol, to be set apart for his use by the capitol commissioner. The said commissioner and assistant commissioners and such experts, chemists, agents and counsel as they shall duly authorize for the purpose, shall have full access, egress and ingress to all places of business, factories, farms, buildings, carriages, vessels and cans used in the manufacture and sale of any dairy products or any imitation thereof. They shall also have power and authority to open any package, can or vessel containing such articles which may be manufactured, sold or exposed for sale, in violation of the provisions of this act, and may inspect the contents therein and may take therefrom samples for analysis. This section shall not affect the tenure of the office of the present commissioner.

§ 13. Upon the application for a warrant under this act, the certificate of the analyst or chemist of any analysis made by him shall be sufficient evidence of the facts therein stated. Every such certificate shall be duly signed and acknowledged by such analyst or chemist before an officer authorized to take acknowledgment of conveyances of real estate.

§ 14. Courts of special sessions shall have jurisdiction of all cases arising under this act, and their jurisdiction is hereby extended so as to enable them to enforce the penalties imposed by any or all sections thereof.

(Amended by section 4 of chapter 577 of Laws of 1886.)

§ 15. In all prosecutions under this act, one-half of the money shall be paid by the court or clerk thereof to the city or county where the recovery shall be had, for the support of the poor, except in the city and county of New York, shall be equally divided between the pension funds of the police and fire departments, and the residue shall be paid to the dairy commissioner, who shall account therefor to the treasury of the state, and be added to any appropriation made to carry out the provisions of this act. All sums of money expended by the dairy commissioner under the provisions of this act, shall be audited and allowed by the comptroller of the state. Any bond given by any officer shall be subject to the provisions of this section.

(Amended by chapter 430 of Laws of 1887.)

§ 16. In all prosecutions under this act relating to the sale and manufacture of unclean, impure, unhealthy, adulterated or unwholesome milk, if the milk be shown to contain more than eighty-eight per centum of water or fluids, or less than twelve per centum of milk solids, which shall contain not less than three per centum of fat, it shall be declared adulterated, and milk drawn from cows within fifteen days before, and five days after, parturition, or from animals fed on distillery waste, or any substance in the state of putrefaction or fermentation, or upon any unhealthy food whatever, shall be declared unclean, unhealthy,

impure and unwholesome milk. This section shall not prevent the feeding of ensilage from silos.

(Amended by section 4 of chapter 458 of Laws of 1885.)

§ 17. The doing of anything prohibited being done, and the not doing of anything directed to be done in this act, shall be presumptive evidence of a willful intent to violate the different sections and provisions thereof. If any person shall suffer any violation of the provisions of this act by his agent, servant, or in any room or building occupied or controlled by him, he shall be deemed a principal in such violation and punished accordingly.

§ 18. Chapter four hundred and sixty-seven of the laws of eighteen hundred and sixty-two, five hundred and forty-four and five hundred and eighteen of the laws of eighteen hundred and sixty-four, five hundred and fifty-nine of the laws of eighteen hundred and sixty-five, four hundred and fifteen of the laws of eighteen hundred and seventy-seven, two hundred and twenty and two hundred and thirty-seven of the laws of eighteen hundred and seventy-eight, four hundred and thirty-nine of the laws of eighteen hundred and eighty, and two hundred and fourteen of the laws of eighteen hundred and eighty-two, are hereby repealed.

(Amended by section 5 of chapter 577 of Laws of 1886, and by section 2 of chapter 583 of Laws of 1887.)

§ 19. If any person shall, by himself or another, violate any of the provisions of sections one, two, three, four or five of this act, or knowingly suffers a violation thereof by his agent, or in any building or room occupied by him, he shall in addition to the fines and punishments therein prescribed for each offense, forfeit and pay a fixed penalty of one hundred dollars. If any person, by himself or another, shall violate any of the provisions of section six, seven or eight of this act, he shall, in addition to the fines and penalties herein prescribed for each offense, forfeit and pay a fixed penalty of five hundred dollars. Such penalties shall be recovered with costs in any court of this state having jurisdiction thereof, in an action to be prosecuted by the dairy

commissioner or any of his assistants in the name of the people of the state of New York.

§ 20. This act and each section thereof is declared to be enacted to prevent deception in the sale of dairy products, and to preserve the public health which is endangered by the manufacture, sale or use of the articles or substances herein regulated or prohibited.

§ 21. This act shall take effect immediately. Sections six and seven shall not apply to any product manufactured, or in process of manufacture at the time of the passage of this act; but neither this exemption nor this act shall impair the power to prosecute any violations heretofore committed of section six of the act of which this act is supplemental.

Chapter 193.

An Act to amend chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled "An act to prevent deception in sales of dairy products."

PASSED April 30, 1885; three-fifths being present.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. Section seven of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled "An act to prevent deception in sales of dairy products," is hereby amended to read as follows:

§ 7. No person shall offer, sell or expose for sale butter or cheese branded or labeled with a false brand or label as to the quality of the article or the county or state in which the article is made. The New York state dairy commissioner is hereby authorized and directed to procure and issue to the cheese manufactories of the state, upon proper application therefor and under such regulations as to the custody and use thereof as he may prescribe, a uniform stencil brand bearing a suitable device or motto, and the words "New York state full cream cheese." Every brand issued shall be used upon the outside of the cheese and also upon the package containing the same, and shall bear a different number for each

separate manufactory, and the commissioner shall keep a book in which shall be registered the name, location and number of each manufactory using the said brand, and the name or names of the persons at each manufactory authorized to use the same. It shall be unlawful to use or permit such stencil brand to be used upon any other than full cream cheese or packages containing the same. Whoever violates the provisions of this section is guilty of a misdemeanor, and for each and every cheese or package so falsely branded shall be punished by a fine of not less than twenty-five dollars or more than fifty dollars, or imprisonment of not less than fifteen or more than thirty days.

§ 2. This act shall take effect immediately.

Chapter 427.

An Act to protect butter and cheese manufacturers.

PASSED June 8, 1885; three-fifths being present.

The People of the State of New York, represented in Senate and Assembly, do enact as follows :

Section 1. Whoever shall with intent to defraud, sell, supply or bring to be manufactured to any butter or cheese manufactory in this state, any milk diluted with water, or in any way adulterated, unclean or impure, or milk from which any cream has been taken, or milk commonly known as skimmed milk, or whoever shall keep back any part of the milk as strippings, or whoever shall knowingly bring or supply milk to any butter or cheese manufactory, that is tainted or sour, or whoever shall knowingly bring or supply to any butter or cheese manufactory, milk drawn from cows within fifteen days before parturition, or within three days after parturition, or any butter or cheese manufacturers who shall knowingly use or allow any of his or her employees or any other person to use for his or her benefit, or for their own individual benefit, any milk or cream from the milk brought to said butter or cheese manufacturer, without the consent of all the owners thereof, or any butter or cheese manufacturer who shall refuse or neglect to keep or cause to be kept a correct account, open to the inspection of any one furnish-

ing milk to such manufacturer, of the amount of milk daily received, or of the number of pounds of butter and the number of cheese made each day, or of the number cut or otherwise disposed of, and the weight of each, shall for each and every offense forfeit and pay a sum not less than twenty-five dollars nor more than one hundred dollars, with costs of suit to be sued for in any court of competent jurisdiction for the benefit of the person or persons, firm or association, or corporation or their assigns upon whom such fraud or neglect shall be committed. But nothing in this act shall affect, impair or repeal any of the provisions of chapter two hundred and two of the laws of eighteen hundred and eighty-four, or of the acts amendatory thereof or supplementary thereto.

§ 2. This act shall take effect immediately.

Chapter 458.

An Act to amend chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, entitled "An act to prevent deception in the sale of dairy products, and to preserve the public health, being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled 'An act to prevent deception in the sales of dairy products.'"

PASSED June 9, 1885; three-fifths being present.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. Section six of chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, entitled "An act to prevent deception in the sale of dairy products, and to preserve the public health, being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled 'An act to prevent deception in sales of dairy products,' " is amended to read as follows:

INVALID — (PEOPLE v. MARX.)

§ 6. No person shall manufacture out of any oleaginous substance or substances, or any compound of the same, other than

that produced from unadulterated milk, or of cream from the same, any article designed to take the place of butter or cheese produced from pure unadulterated milk or cream of the same, or shall sell, or offer for sale, the same as an article of food. This provision shall not apply to pure skim-milk cheese, made from pure skim-milk. Whoever violates the provisions of this section shall be guilty of a misdemeanor, and be punished by a fine of not less than one hundred dollars nor more than five hundred dollars, or not less than six months' or more than one year's imprisonment, or both such fine and imprisonment for the first offense, and by imprisonment for one year for each subsequent offense.

§ 2. Section seven of said act is amended so as to read as follows:

(Amended by section 2, chapter 577 of Laws of 1886.)

§ 7. No person by himself or his agents or servants shall render or manufacture out of any animal fat or animal or vegetable oils not produced from unadulterated milk or cream from the same, any article or product in imitation or semblance of or designed to take the place of natural butter or cheese produced from pure unadulterated milk or cream of the same, nor shall he or they mix, compound with, or add to milk, cream or butter any acids or other deleterious substance or any animal fats or animal or vegetable oils not produced from milk or cream, with design or intent to render, make or produce any article or substance or any human food in imitation or semblance of natural butter or cheese, nor shall he sell, keep for sale, or offer for sale any article, or substance or compound made, manufactured or produced in violation of the provisions of this section, whether such article, substance or compound shall be made or produced in this state or any other state or country. Whoever violates the provisions of this section shall be guilty of a misdemeanor and be punished by a fine of not less than one hundred dollars nor more than five hundred dollars, or not less than six months' or more than one year's imprisonment for the first offense, and by imprisonment for one year for each subsequent offense. Nothing in this section shall impair the provisions of section six of this act.

§ 3. Section eight of said act is amended so as to read as follows:

(Amended by section 3 of chapter 577 of Laws of 1886.)

§ 8. No person shall manufacture, mix or compound with or add to natural milk, cream or butter any animal fats or animal or vegetable oils, nor shall he make or manufacture any oleaginous substance not produced from milk or cream, with intent to sell the same for butter or cheese made from unadulterated milk or cream, or have the same in his possession, or offer the same for sale with such intent, nor shall any article or substance or compound so made or produced, be sold for butter or cheese, the product of the dairy. If any person shall coat, powder or color with annatto or any coloring matter whatever butterine or oleomargarine, or any compounds of the same or any product or manufacture made in whole or in part from animal fats or animal or vegetable oils not produced from unadulterated milk or cream whereby the said product, manufacture or compound shall be made to resemble butter or cheese, the product of the dairy, or shall have the same in his possession, or shall sell or offer for sale or have in his possession any of the said products which shall be colored or coated in semblance of or to resemble butter or cheese, it shall be conclusive evidence of an intent to sell the same for butter or cheese, the product of the dairy. Whoever violates any of the provisions of this section shall be guilty of a misdemeanor, and be punished by a fine of not less than one hundred dollars nor more than one thousand dollars. This section shall not be construed to impair or affect the prohibitions of sections six and seven of this act.

§ 4. Section seventeen of said act is amended so as to read as follows:

§ 17. The doing of anything herein prohibited being done, shall be evidence of a violation of the provisions of this act relative to the thing so prohibited; and the not doing of anything herein directed to be done, shall be evidence of a violation of the provisions of this act relative to the thing so directed to be done. If any person shall suffer any violation of the provisions of this act

by his agent, servant, or in any room or building occupied or controlled by him, he shall be deemed a principal in such violation and punished accordingly.

§ 5. This act shall take effect immediately.

Chapter 577.

An Act to amend chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, entitled "An act to prevent deception in the sale of dairy products, and to preserve the public health," being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled "An act to prevent deception in sales of dairy products."

PASSED June 4, 1886; three-fifths being present.

The People of the State of New York, represented in Senate and Assembly, do enact as follows :

Section 1. Section one of chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, entitled "An act to prevent deception in the sale of dairy products, and to preserve the public health," being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled "An act to prevent deception in sales of dairy products," is hereby amended so as to read as follows:

(Amended by chapter 223 of Laws of 1887.)

§ 1. No person or persons shall sell or exchange, or expose for sale or exchange, any unclean, impure, unhealthy, adulterated or unwholesome milk, or shall offer for sale any article of food made from the same, or of cream from the same. The provisions of this section shall not apply to skimmed milk sold for use in the county in which it is produced, provided it is sold for and as such. This provision shall not apply to pure skim-cheese made from milk which is clean, pure, healthy, wholesome and unadulterated, except by skimming. Whoever violates the provisions of this section is guilty of a misdemeanor, and shall be punished by

a fine of not less than twenty-five dollars nor more than two hundred dollars, or by imprisonment of not less than one month or more than six months, or by both such fine and imprisonment, for the first offense, and by six months' imprisonment for each subsequent offense.

§ 2. Section seven of chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, as amended by chapter four hundred and fifty-eight, of the laws of eighteen hundred and eighty-five, is hereby amended so as to read as follows:

§ 7. No person by himself or his agents or servants shall render or manufacture out of any animal fat or animal or vegetable oils not produced from unadulterated milk or cream from the same, any article in imitation or semblance of natural butter or cheese produced from pure unadulterated milk or cream of the same, nor mix, compound with, or add to milk, cream or butter any acids or other deleterious substance or any animal fats or animal or vegetable oils not produced from milk or cream, so as to produce any article or substance or any human food in imitation or semblance of natural butter or cheese, nor sell, keep for sale, or offer for sale, any article, substance or compound made, manufactured or produced in violation of the provisions of this section, whether such article, substance or compound shall be made or produced in this State or elsewhere. This section shall not be so construed as to require evidence of a willful or intentional violation thereof. Whoever violates the provisions of this section shall be guilty of a misdemeanor, and be punished by a fine of not less than one hundred dollars, nor more than five hundred dollars or not less than six months or more than one year's imprisonment for the first offense, and by imprisonment for one year for each subsequent offense. Nothing in this section shall impair the provisions of section six of this act.

§ 3. Section eight of chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, as amended by chapter four hundred and fifty-eight of the laws of eighteen hundred and eighty-five, is hereby further amended so as to read as follows:

§ 8. No person shall manufacture, mix or compound with or add to natural milk, cream or butter any animal fats or animal or vegetable oils, nor shall he make or manufacture any oleaginous substance not produced from milk or cream, with intent to sell the same for butter or cheese made from unadulterated milk or cream, or have the same in his possession, or offer the same for sale with such intent, nor shall any article or substance or compound so made or produced, be sold intentionally or otherwise as and for butter or cheese, the product of the dairy. No person shall coat, powder or color with annatto or any coloring matter whatever, butterine or oleomargarine, or any compounds of the same or any product or manufacture made in whole or in part from animal fats or animal or vegetable oils not produced from unadulterated milk or cream whereby the said product, manufacture or compound shall resemble butter or cheese, the product of the dairy, or shall have the same in his possession, with intent to sell the same, or shall sell or offer the same for sale. No person shall be excused from liability under this section or section seven of this act on account of want of knowledge of the nature or ingredients of the product so in his possession, sold or offered for sale by him. Whoever violates any of the provisions of this section shall be guilty of a misdemeanor, and be punished by a fine of not less than one hundred dollars nor more than one thousand dollars. This section shall not be construed to impair or affect the prohibitions of sections six and seven of this act.

§ 4. Section fifteen of such act, chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, is hereby amended so as to read as follows:

§ 15. In all prosecutions under this act, one-half of the money shall be paid by the court or clerk thereof to the city or county where the recovery shall be had, for the support of the poor, except in the city and county of New York, and the city of Brooklyn shall be equally divided between the pension funds of the police and fire departments, and the residue shall be paid to the treasury of the state. All sums of money expended by the dairy commissioner under the provisions of this act, shall be audited

and allowed by the comptroller of the State. Any bond given by any officer shall be subject to the provisions of this section.

§ 5. Section nineteen of such act, chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, is hereby amended so as to read as follows:

(Amended by section 2 of chapter 583 of Laws of 1887.)

§ 19. If any person shall, by himself or another, violate any of the provisions of sections one, two, three, four or five of this act, or knowingly suffer a violation thereof by his agent, or in any building or room occupied by him, he shall in addition to the fines and punishments therein prescribed, for each offense forfeit and pay a fixed penalty of one hundred dollars. If any person, by himself or another, shall violate any of the provisions of sections six, seven or eight of this act, he shall, in addition to the fines and penalties herein prescribed, for each offense forfeit and pay a fixed penalty of five hundred dollars. Such penalties shall be recovered with costs in any court of this state having jurisdiction thereof, in an action to be prosecuted by the dairy commissioner or any of his assistants or by any citizen authorized to sue in the name of the people of the State of New York.

§ 6. The following sections are added to said act, chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five:

(Amended by section 3 of chapter 583 of Laws of 1887.)

§ 22. For the purposes of said act, chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, as amended by chapter four hundred and fifty-eight of the laws of eighteen hundred and eighty-five, and as hereby amended, the terms "natural butter and cheese," "natural butter and cheese produced from pure unadulterated milk or cream of the same," "butter or cheese made from unadulterated milk or cream," "butter or cheese the product of the dairy," and "butter or cheese" shall be understood to mean the products usually known by the terms "butter" and "cheese" and which are manufac-

tured exclusively from milk or cream, or both, with salt and rennet, and with or without coloring matter or sage.

§ 23. The prosecution shall not be compelled to elect in any trial for the misdemeanors wheresoever committed, or suit for the penalties wheresoever incurred by the violations of sections six, seven or eight where the indictment, information or complaint charges a violation of any two or all such sections of said act, as amended, between the charges or counts under such different sections whether such prosecutions or suits have already been commenced or shall hereafter be instituted.

§ 24. An action now or hereafter brought to recover a penalty provided by section nineteen of said act, chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, shall have a preference upon the calendar of the courts of record of this State next after civil causes entitled to a preference under the provisions of subdivision one of section seven hundred and ninety-one of the code of civil procedure, where the attorney for the people therein has given notice, at the time of the service of notice of trial or argument, of a particular day in a term on which he will move it. If the action is not moved by him for trial or argument on that day, or as soon thereafter in the same term as the court can hear it the other party may then move the trial or argument, otherwise it shall not be moved out of its order at that term except by the special order of the court. The note of issue filed by such attorney for the people shall state the day in the term on which he has given notice that he will move it, and the clerk of the court shall place such cause upon the day calendar of that day as a preferred cause as hereinbefore provided. No order for the clerk to do so shall be necessary.

§ 25. Actions for penalties under the provisions of this act and of the act of which this is amendatory may be brought and prosecuted in the name of the people of the state of New York by any citizen of the State, and the citizen so prosecuting said action shall be entitled to and shall receive one-half of the penalty or judgment recovered. The balance of the judgment or recovery shall be paid over to the city or county in which the action is brought as provided by section fifteen of chapter one hundred and eighty-three

of the laws of eighteen hundred and eighty-five. Any citizen so prosecuting shall execute and file an undertaking with the court in which the action is brought in the penalty of one hundred dollars conditioned for the payment of any costs which the defendant in the action may recover.

§ 7. This act shall take effect on the first day of August, eighteen hundred and eighty-six; but the sections as herein amended shall not apply to any product manufactured or in process of manufacture on the first day of August, eighteen hundred and eighty-six. This act shall not impair the power to prosecute any violations committed prior to the time of its taking effect, of the sections hereby amended pursuant to and in the manner and under the rules and regulations provided by such sections as they existed prior to the passage of this act. This act is declaratory of the existing law.

Chapter 223.

An Act to amend chapter five hundred and seventy-seven of the laws of eighteen hundred and eighty-six, entitled "An act to amend chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, entitled 'An act to prevent deception in the sale of dairy products, and to preserve the public health,' being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled 'An act to prevent deception in the sales of dairy products.'"

PASSED April 27, 1887; three-fifths being present; without the approval of the Governor.*

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. Section one of chapter five hundred and seventy-seven of the laws of eighteen hundred and eighty-six, entitled "An act to amend chapter one hundred and eighty-three of the laws of

* Not returned by the Governor within ten days after it was presented to him, and became a law without his signature. [Art. IV, sec, 9, Constitution of the State of New York.]

eighteen hundred and eighty-five, entitled 'An act to prevent deception in the sale of dairy products, and to preserve the public health,' being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled 'An act to prevent deception in sales of dairy products,' is hereby amended so as to read as follows:

§ 1. No person or persons shall sell or exchange, or expose for sale or exchange,* any unclean, impure, unhealthy, adulterated or unwholesome milk, or shall offer for sale any article of food made from the same, or of cream from the same. The provisions of this section shall not apply to skimmed milk sold for use in the county in which it is produced, provided it is sold for and as such. This provision shall not apply to pure skim cheese made from milk which is clean, pure, healthy, wholesome and unadulterated, except by skimming. Whoever violates the provisions of this section is guilty of a misdemeanor, and shall be punished by a fine of not less than twenty-five dollars nor more than two hundred dollars or by imprisonment of not less than one month or more than six months, or by both such fine and imprisonment for the first offense; and by a fine of not less than fifty dollars nor more than four hundred dollars or by imprisonment of not less than one month nor more than six months, or by both such fine and imprisonment for a second offense, and for a third or any subsequent offense by a fine of not less than two hundred dollars and imprisonment not less than thirty days and not exceeding three months.

§ 2. This act shall take effect immediately.

* So in the original.

Chapter 430.

An Act to amend chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, entitled "An act to prevent deception in the sale of dairy products and to preserve the public health, being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled 'An act to prevent deception in the sale of dairy products.'"

PASSED May 23, 1887; three-fifths being present.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. Section sixteen of chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, entitled "An act to prevent deception in the sale of dairy products, and to preserve the public health, being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled 'An act to prevent deception in sales of dairy products,' " is hereby amended so as to read as follows:

§ 16. When any officer, authorized by this act to inspect milk offered for sale shall, in the discharge of his duties, take a sample of milk for purposes of analysis, it shall be his duty to take duplicate samples thereof, in the presence of at least one witness, and he shall, in the presence of such witness, seal both of the said samples, and shall tender and if accepted deliver, at the time of such taking, one sample to the vender of said milk or to the person having custody of the same with a statement, in writing, of the cause of the sample having been taken. In all prosecutions, under this act, relating to the manufacture and sale of unclean, impure, unhealthy, adulterated or unwholesome milk, if the milk be shown to contain more than eighty-eight per centum of water or fluids, or less than twelve per centum of milk solids, which should contain not less than three per centum of fat, it shall be declared adulterated; and milk drawn from cows within fifteen days before, and five days after, parturition, or from animals fed on distillery waste, or any substance in the state of fermentation or putrefaction, or upon any unhealthy food whatever, shall be declared unclean,

unhealthy, impure and unwholesome milk. This section shall not prevent the feeding of ensilage.

§ 2. This act shall take effect immediately.

Chapter 583.

An Act to amend chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, entitled "An act to prevent deception in the sale of dairy products, and to preserve the public health, being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled 'An act to prevent deception in sales of dairy products,' as amended by chapter five hundred and seventy-seven of the laws of eighteen hundred and eighty-six, entitled 'An act to amend chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, entitled 'An act to prevent deception in the sale of dairy products, and to preserve the public health,' being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled 'An act to prevent deception in sales of dairy products.'"

PASSED June 16, 1887; three-fifths being present.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. The following sections are added to said act chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, entitled "An act to prevent deception in the sale of dairy products, and to preserve the public health," being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled "An act to prevent deception in sales of dairy products," as amended by chapter five hundred and seventy-seven of the laws of eighteen hundred and eighty-six, entitled "An act to amend chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, entitled 'An act to prevent deception in the sale of dairy products and to preserve the public health,' being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled 'An act to prevent deception in sales of dairy products.'"

§ 26. A search warrant, in the name of the people, directed to a peace officer commanding him to search for dairy products, imitations thereof and substitutes therefor, to open any place of business, factory, building, store, bakery, hotel, tavern, boarding-house, restaurant, saloon, lunch counter, place of public entertainment, carriage, car, boat, package, vessel, barrel, box, tub or can, containing, or believed to contain the same, in the possession or under the control of any person who shall refuse to allow the same to be inspected or samples taken therefrom by the said commissioner, assistant commissioner, or such experts, chemists, agents, or counsel as such commissioner or assistant commissioner shall duly authorize for the purpose, or to which access is refused or prevented, and to allow and enable the officer mentioned in section twelve applying therefor to take such samples of dairy products, imitations thereof and substitutes therefor, found in the execution of the warrant, as the officer applying for the search warrant shall designate when the same are found, shall be issued by any magistrate to whom application is made therefor, whenever it shall be made to appear to him that such person has refused to permit any dairy products, imitations thereof or substitutes therefor, to be inspected or samples taken therefrom, or that access thereto by any officer mentioned in section twelve has been refused or prevented, and that such officer has reasonable grounds for believing that such person has any dairy products, imitations thereof or substitutes therefor in his possession, or under his control, or that he is violating any of the provisions of this act. The provisions of section seven hundred and ninety-one to section eight hundred and two, both inclusive, of the Code of Criminal Procedure, shall apply to such warrant as far as applicable thereto. The peace officer to whom the warrant is delivered shall make a return in writing of his proceedings thereunto to the magistrate who issued the same.

(Amended by section 1 of chapter 140 of Laws of 1891.)

§ 27. No keeper or proprietor of any bakery, hotel, tavern, boarding-house, restaurant, saloon, lunch counter, or place of public entertainment, or any person having charge thereof or employed

thereat, shall keep, use or serve therein, either as food for their guests, boarders, patrons or customers, or for cooking purposes, any article made in violation of the provisions of section seven of this act, as amended by chapter five hundred and seventy-seven of the laws of eighteen hundred and eighty-six. This section shall not be so construed as to require evidence of a willful or intentional violation thereof. Whoever violates the provisions of this section shall be guilty of a misdemeanor and punished by a fine of not less than fifty dollars, nor more than two hundred dollars, or not less than ten days' or more than thirty days' imprisonment for the first offense, and by imprisonment for one year for each subsequent offense.

§ 2. Section nineteen of such act, chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, as amended by chapter five hundred and seventy-seven of the laws of eighteen hundred and eighty-six, is hereby amended so as to read as follows:

§ 19. If any person shall, by himself or another, violate any of the provisions of sections one, two, three, four or five of this act, or knowingly suffer a violation thereof by his agent, or in any building or room occupied by him, he shall in addition to the fines and punishments therein prescribed, for each offense forfeit and pay a fixed penalty of one hundred dollars. If any person, by himself or another, shall violate any of the provisions of sections six, seven, eight or twenty-seven of this act, he shall, in addition to the fines and penalties therein prescribed for each offense forfeit and pay a fixed penalty of five hundred dollars. Such penalty shall be recovered, with costs, in any court of this State having jurisdiction thereof, in an action to be prosecuted by the Dairy Commissioners or any of his assistants, or by any citizen authorized to sue in the name of the people of the State of New York. In any action heretofore or hereinafter commenced in the supreme court for the recovery of such penalties an application may be made on the part of the plaintiff to said court or any justice thereof, for an injunction to restrain the defendant, his agents, servants and employes, from the further violation of the sections or section on which such action is based during the pen-

dency thereof; and it shall be the duty of such court or justice to grant the injunction upon proof by affidavits that the defendant has been guilty of a violation of such sections or section as alleged in the complaint, or subsequent to the commencement of the action has been guilty of a violation thereof, and in the same manner as injunctions are usually granted under the rules and practice of such court. No security on the part of the plaintiff shall be required upon the granting of such injunction; and the court or justice shall make such order thereon as to the costs of the application as may be deemed just and proper. In case the plaintiff shall recover judgment for the penalties or penalty demanded in the complaint, the said judgment shall contain a permanent injunction restraining the defendant, his agents, servants and employes from any further violations of the sections or section on which the recovery is obtained. Any injunction secured under this section may be served by posting the same upon the outer door of the defendant's usual place of business, or where such violation was committed, or shall thereafter be committed, or in the manner required by the Code of Civil Procedure and the rules and practice of the court. It shall not be necessary to prove the personal service of the injunction where such service cannot be secured with reasonable diligence, but the service hereinbefore provided shall be deemed and held sufficient in any proceeding for the violation of such injunction.

§ 3. Section twenty-two of such act chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, as added thereto by chapter five hundred and seventy-seven of the laws of eighteen hundred and eighty-six, is hereby amended so as to read as follows:

§ 22. For the purposes of said act, chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, as amended by chapter four hundred and fifty-eight of the laws of eighteen hundred and eighty-five, and by chapter five hundred and seventy-seven of the laws of eighteen hundred and eighty-six, and as hereby amended, the terms "natural butter and cheese," "natural butter or cheese produced from pure unadulterated milk or cream of the same," "butter or cheese made from unadulterated

milk or cream," "butter or cheese, the product of the dairy," and "butter or cheese," shall be understood to mean the products* usually known by the terms "butter" and "cheese," and which are manufactured exclusively from milk or cream, or both, with or without salt or rennet, or both, and with or without coloring matter or sage or both.

§ 4. This act shall take effect immediately. Section three and section twenty-seven, hereby added to such act chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, shall not apply to any product manufactured, or in process of manufacture, at the time of the passage of this act; but neither this exemption nor this act shall impair the power to prosecute any violations committed prior to the time of its taking effect of the sections hereby amended or of any laws existing at the time of its taking effect pursuant to and in the manner and under the rules and regulations provided by such sections and laws as they existed prior to the passage of this act.

Chapter 298.

An Act to promote agriculture and improve the quality of butter and cheese.

APPROVED by the Governor May 15, 1888. Passed, three-fifths being present.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. The New York State Dairy Commissioner is authorized, empowered and directed to appoint and employ expert butter and cheese makers, not exceeding five in number, whose duty it shall be, under his directions, to examine and inspect butter and cheese factories and the methods employed therein, and attend at such agricultural fairs, institutes, meetings and conventions, within the State, as shall be designated by the Commissioner, to impart thereat information as to the best and most approved methods of making butter and cheese and improving the quality thereof. The compensation of such experts shall be fixed by the

* So in the original.

Commissioner and their necessary expenses incurred in the performance of their duty audited by him; and the same shall be paid by the Treasurer of the State upon the warrant of the Comptroller thereafter. The sum of five thousand dollars is hereby appropriated for such purpose, to be paid out of any moneys in the treasury not otherwise appropriated; and the entire expenses of the Commissioners under this act shall not exceed such sum. The Commissioner on or before the fifteenth day of December of this year shall report the number of experts employed under this act and their compensation and expenses, which shall be included in his annual report.

§ 2. This act shall take effect immediately.

Chapter 550.

An Act to amend chapter five hundred seventy-seven of the laws of eighteen hundred and eighty-six entitled "An act to amend chapter one hundred eighty-three of the laws of eighteen hundred eighty-five entitled 'An Act to prevent deception in the sales of dairy products, and to preserve the public health,' being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled 'An act to prevent deception in the sale of dairy products'" as amended by chapter two hundred twenty-three of the laws of eighteen hundred eighty-seven.

APPROVED by the Governor June 9, 1888. Passed, three-fifths being present.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. Section one of chapter five hundred and seventy-seven of the laws of eighteen hundred and eighty-six, entitled "An act to amend chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, entitled 'An act to prevent deception in the sale of dairy products, and to preserve the public health,' being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled 'An act to prevent deception in the sales of dairy products,'" as

amended by chapter two hundred and twenty-seven of the laws of eighteen hundred and eighty-seven, is hereby amended so as to read as follows:

§ 1. No person or persons shall sell or exchange, or expose for sale or exchange, any unclean, impure, unhealthy, adulterated or unwholesome milk, or shall offer for sale any article of food made from the same, or of cream from the same. The provisions of this section shall not apply to skimmed milk sold for use in the county in which it is produced, and the adjoining counties, except in New York and Kings counties (where it shall apply), provided it is sold for and as such. This provision shall not apply to pure skim cheese made from milk which is clean, pure, healthy, wholesome and unadulterated, except by skimming. Whoever violates the provisions of this section is guilty of a misdemeanor, and shall be punished by a fine of not less than twenty-five dollars nor more than two hundred dollars or by imprisonment of not less than one month or more than six months, or by both such fine and imprisonment for the first offense; and by a fine of not less than fifty dollars nor more than four hundred dollars or by imprisonment of not less than one month nor more than six months, or by both such fine and imprisonment for a second offense, and for a third or any subsequent offense by a fine of not less than two hundred dollars and imprisonment not less than thirty days and not exceeding three months.

§ 2. This act shall take effect immediately.

Chapter 515.

An Act to prevent deception in sales of vinegar, and charging the New York State Dairy Commissioner with its enforcement.

APPROVED by the Governor June 15, 1889. Passed, three-fifths being present.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. No person shall manufacture, produce, sell, keep for sale or offer for sale any vinegar which shall not have an acidity equivalent to the presence of at least four and one-half per

centum, by weight, of absolute acetic acid, or any cider vinegar which shall have less than such amount of acidity, or less than two per centum, by weight, of cider vinegar solids upon full evaporation over boiling water.

§ 2. No person shall manufacture, produce, sell, keep for sale or offer for sale any vinegar or product in imitation or semblance of cider vinegar which is not cider vinegar.

§ 3. No person shall sell, keep for sale or offer for sale, as or for cider vinegar, any vinegar or product which is not cider vinegar.

§ 4. No person shall manufacture, produce, sell, keep for sale or offer for sale any vinegar which shall contain any preparation of lead, copper, sulphuric acid or other ingredients injurious to health, or any artificial coloring matter.

§ 5. Every manufacturer or producer of cider vinegar shall plainly brand on each head of the cask, barrel, keg or other package containing such vinegar, his name and place of business, and the words "cider vinegar;" and no person shall label or brand as for cider vinegar any package containing vinegar which is not cider vinegar.

§ 6. Whoever, by himself or another, violates any of the provisions of any of the foregoing sections shall be guilty of a misdemeanor and, upon conviction, shall be punished by a fine of not less than fifty dollars nor more than one hundred dollars.

§ 7. If any person, by himself or another, shall violate any of the provisions of sections one, two, three, four or five of this act, he shall, in addition to the fines and penalties herein prescribed for each offense, forfeit and pay a fixed penalty of two hundred dollars for each offense. Such penalties shall be recovered with costs in any court of this State having jurisdiction thereof, in an action to be prosecuted by the New York State Dairy Commissioner or any of his assistants in the name of the people of the State of New York.

§ 8. The prosecution shall not be compelled to elect in any trial for the misdemeanors or suit for the penalties for the violation of sections one, two, three, four or five, where the indictment, information or complaint charges a violation of any two or more of such sections, between the charges or counts under such different sections.

§ 9. The New York State Dairy Commissioner is charged with the enforcement of the provisions of this act. The sum of five thousand dollars is hereby appropriated to be paid for such purpose out of any moneys in the treasury not otherwise appropriated, and the same shall be paid by the Treasurer of the State upon the warrant of the Comptroller upon the certificate of the State Dairy Commissioner. The entire expenses of said Commissioner in the enforcement of the provisions of this act shall not exceed the sum appropriated for the purposes aforesaid. Such Commissioner shall include in his annual report to the legislature a statement in detail of his work and proceedings, the number of assistant commissioners, chemists, experts, agents and counsel employed under the provisions of this act and their compensation, expenses and disbursements. The said commissioner and assistant commissioners, and such experts, chemists, agents and counsel as they shall duly authorize for the purpose, shall have full access, egress and ingress to all places of business, factories and buildings where vinegar is made, produced, sold or kept for sale. They shall also have power and authority to open any cask, barrel, keg or other package containing or believed to contain vinegar manufactured, produced, sold, kept for sale, or offered for sale, in violation of the provisions of this act, and may inspect the contents thereof and take therefrom samples for examination and analysis. When any officer authorized by this act to inspect vinegar offered for sale shall in the discharge of his duties take samples of vinegar it shall be his duty to take duplicate samples thereof, in the presence of at least one witness, and he shall, in the presence of such witness, seal both of said samples, and shall tender, and, if accepted, deliver, at the time of such taking, one sample to the vender of said vinegar or to the person having custody of the same, with a statement, in writing, of the cause of the samples having been taken.

§ 10. For the purposes of this act, the term "cider vinegar" shall be understood to mean vinegar made exclusively of pure apple-juice. Sections one, two and four shall not apply to any vinegar or produce manufactured or in process of manufacture at

the time of the passage of this act, but the provision of law existing at the time of the passage of this act shall apply thereto.

§ 11. Chapter six hundred and six of the laws of one thousand eight hundred and eighty-six, and chapter six hundred and thirty-four of the laws of one thousand eight hundred and eighty-seven, are hereby repealed, but any violations thereof committed prior to the taking effect of this act may be prosecuted under the provisions of such law as they existed prior to the passage of this act.

§ 12. This act shall take effect immediately.

Chapter 140.

[An Act further to amend chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, entitled "An act to prevent deception in the sale of dairy products and to preserve the public health, being supplementary to and in aid of chapter two hundred and two of the laws of eighteen hundred and eighty-four, entitled 'An act to prevent deception in sales of dairy products.'"]

APPROVED by the Governor April 7, 1891. Passed, three-fifths being present.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. Section twenty-seven of chapter one hundred and eighty-three of the laws of eighteen hundred and eighty-five, as added thereto by section one of chapter five hundred and eighty-three of the laws of eighteen hundred and eighty-seven, is hereby amended so as to read as follows:

§ 27. No keeper or proprietor of any bakery, hotel, tavern, boarding-house, restaurant, saloon, lunch counter, or place of public entertainment or of any place where any person or persons, in the employ of the keeper or proprietor thereof, is furnished with board, either without charge or as compensation wholly or in part for his services, or any person having charge thereof or employed thereat, shall, keep, use or serve therein, either as food for their

guests, boarders, patrons or customers, or for cooking purposes, any article made in violation of the provisions of section seven of this act, as amended by chapter five hundred and seventy-seven of the laws of eighteen hundred and eighty-six. This section shall not be construed as to require evidence of a willful or intentional violation thereof. Whoever violates the provisions of this section shall be guilty of a misdemeanor and punished by a fine of not less than fifty dollars nor more than two hundred dollars, of not less than ten days' or more than thirty days' imprisonment for the first offense, and by imprisonment for one year for each subsequent offense.

§ 2. This act shall take effect immediately.

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